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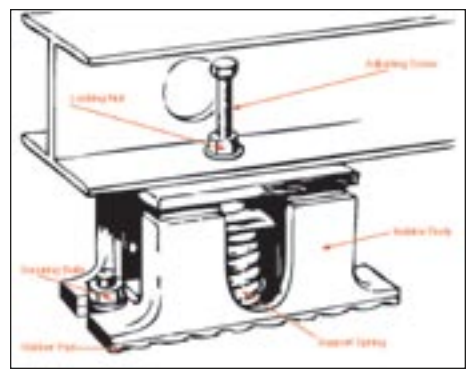

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Events Calendar

Industry Trade Shows

POWER-GEN International 2009
December 8-10, 2009; Las Vegas Convention Center, Las Vegas, NV
The world's biggest show for power generation, featuring the EGSA On-Site Power Pavilion. For exhibit information, contact EGSA at (561) 750-5575, ext. 205 or e-mail Jalane Kellough at *J.Kellough@EGSA.org.*

Renewable Energy World
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February 23-25, 2010; Austin, TX
Technical sessions relate to technology, markets, business strategies and policy covering the wind, solar, biomass, hydro, geothermal, ocean/tidal/wave, bio-power, bio-fuels hydrogen and energy sectors. The Photovoltaics World Conference & Exposition will be co-located with Renewable Energy World North America 2010. For more information, visit *www.renewableenergyworld.com.*

Conferences

EGSA 2009 Fall Technical & Marketing Conference
September 13-15, 2009; Colorado Springs, CO

Speakers will cover business and technical aspects of On-Site Power Generation and current industry trends. For information, visit *www.EGSA.org* or call (561) 750-5575.

EGSA 2010 Annual Spring Convention
March 14-16, 2010, St. Petersburg, FL
The Association's Annual Convention of Members. Speakers will cover business and technical aspects of On-Site Power Generation and current industry trends. For additional information, visit *www.EGSA.org* or call (561) 750-5575.

Schools

EGSA On-Site Power Generation Basic Schools
Hartford, CT ..... June 16-18, 2009
Portland, OR..... August 4-6, 2009
Memphis, TN..... October 13-15, 2009

EGSA On-Site Power Generation Advanced Schools
Las Vegas, NV* ..... December 7-10, 2009
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Look for more industry events in our up-to-date calendar on the web at *www.EGSA.org. EGSA Members*: To list your meetings here, fax your information to (561) 395-8557.

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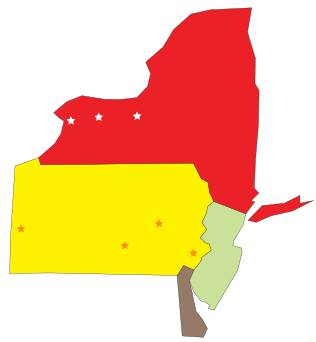

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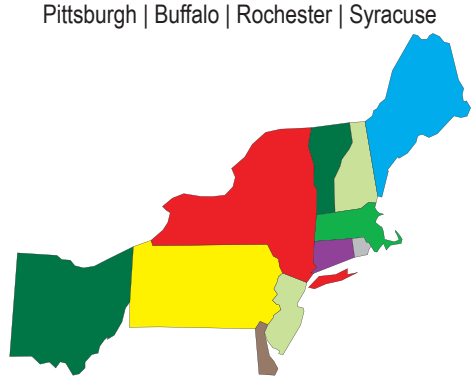

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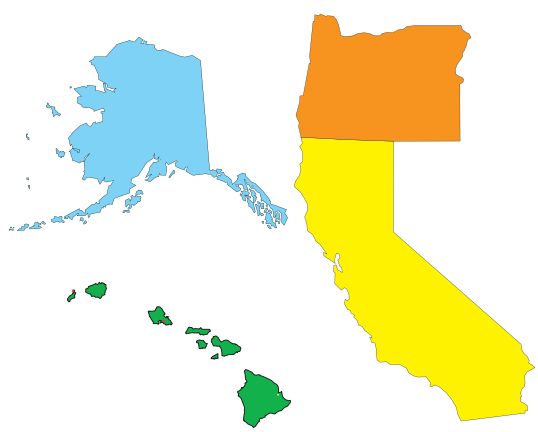

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Greg Linton
2009 EGSA President

Communicating Effectively

Effective ommunication—the imparting or exchange of thoughts, opinions, or information by speech, writing, or signs—is critical to every individual's personal and professional success. How would you rate yourself in the area of communication? Did you know there are two parts required in effective communication: a speaker and a listener? Which role do you play?

Men and women communicate in very different ways. Statistics reveal that the average man uses approximately 7,000 words per day, while the average woman uses 20,000 words per day. No wonder when you arrive home in the evening your lady is still able to discuss her day while you have run out of steam. If you have daughters the impact is multiplied, while our sons offer monosyllabic responses along with a periodic grunt. But in the family dynamic, communication is critical; with a little stretch of the imagination we could compare EGSA to the family model. We have different genders, different geographical locations, different market segmentation, different educational backgrounds, different agendas—we're different! In an Association like EGSA, communication is vital to overcoming our differences and contributing to our collective success. Let's examine why.

In the first 30 days following the 2009 Spring Conference held in San Antonio, a significant amount of activity occurred within EGSA. For example:

- several suggestions were offered regarding future conferences, timing, location, and structure;
- the Strategic Plan (a wonderful future tool for communication) received input that will change the key phrasing and definition of the Plan;
- numerous ideas were discussed as to maximizing the value from the speakers' presentations;
- a plan to implement Board Liaison interaction with the various committees was discussed and reviewed; and
- the Board of Directors commissioned a data gathering effort to collect and provide every EGSA member with State and Federal contact and program information relative to the Federal government's stimulus package.

By the time this article crosses your desk, another 45 days will have passed and an additional volume of work will have been conducted. In fact, the aforementioned data gathering has already been delivered to you (via an email link) in a concise report format, and many member companies will have begun to act on and benefit from the information. In addition, the Board is actively working on several items that will directly impact the Fall Conference in Colorado Springs.

Continued on next page

In order for these efforts to have impact, it is critical that you are aware of them prior to your arrival at the conference. These communications will come primarily through the Committee Chairs directly to those actively involved in the various committees. Prior to your arrival, each Committee Chair should have distributed the Committee meeting agenda and sought input in preparation for everyone's arrival. With that in mind, let me slip in another thought. Participation. The act of participation has many valuable elements. You are informed. You help shape the Association and the Industry. Others gain from your knowledge and perspective. You are likely to see a much greater return on your membership and conference attendance investment. The "good ole boy syndrome" will disappear right before your very eyes as you experience the impact you have. The pool of talent available to the Association will grow. We can create an internal stimulus package with fresh new ideas for today and the future. This is merely a partial list of the significance of **your** participation. My hope is that you will be fully informed of Association events and developments and you will arrive in Colorado Springs with great anticipation and prepared to gain from and contribute to the conference.

As an Association, we must reach new levels of commitment and effectiveness in our communication efforts. From EGSA staff, the Executive Board, the Board of Directors, the Committee Chairs, all the way to the newest member.

Let me challenge you with a few questions:

1. What information do you need to get the most value from your membership and conference attendance?
2. Will your past involvement automatically afford you Association updates? Via *Powerline*? Via Action Alerts? Via Committee correspondence?
3. What do you need to do to gather the information that is important to you?
4. The EGSA Fall Conference will take place in September. What do you expect to gain and offer during that time?

As a final thought, let me know what I or the Association can do to meet your needs in the area of communication. You can best reach me at *glinton@jrscustomfab.com*. I close with a few quotes that may stimulate your thoughts as we grow together in our ability to communicate with one another. ■

When all other means of communication fail, try words.
—Unknown

The single biggest problem in communication is the illusion that is has taken place.
—George Bernard Shaw

To listen well is as powerful a means of communication and influence as to talk well.
—John Marshall

Communication is depositing a part of yourself in another person.
—Unknown

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George Rowley
EGSA Director
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EGSA Generator Technician Certification Program Update

The Certification Program continues to post modest growth albeit at a slower rate than in the past. As of the end of March, 261 techs had passed the certification test and have become EGSA Certified Generator Systems Technicians. Among the seven techs passing the test in March were four techs from Trinidad. The number of certified techs working outside of the United States now totals 19; there are 11 Certified Technicians in Canada and 8 in Trinidad. Since program launch, the overall pass rate is 83%. Congratulations to all that have passed the test and good luck to those that are preparing to take it!

As has been previously reported, the pace of Certification Program growth appeared to slow beginning in the last quarter of 2008. Sixteen techs had passed the test through March 2009 and at that rate, about 64 are projected to pass the test this year. In comparison, an average of 99 techs per year passed the test in 2007 and 2008. Members previously reported that they and their techs were so busy that they did not have time to prepare for and take the test. The EGSA Certification Committee and Board of Directors are now trying to determine if this continues to be a problem or if growth has slowed as a result of the current economy or a combination of several factors.

We will soon receive Spanish-language versions of the Certification Study Guide and test. After we verify the accuracy of the translation(s), these items will be available for purchase through Ferris State University. We will post announcements in *Powerline* magazine and on our website when these items are available. There are no plans to offer a Spanish-language version of the *Reference Book*.

Reference Book Sales and On-Site Power School Attendance

We are pleased to report that, thus far, sales of the *EGSA On-Site Power Generation: A Reference Book* and attendance at our On-Site Power Schools do not appear to have been adversely affected by the economic downturn. School registrations, which are limited to 40 at each school, have been very strong with the maximum 40 registered for both the Charleston, SC Basic School and the Indianapolis Advanced School. Likewise, Reference Book sales continue to be strong at an average rate of 93 per month, which is about the same as the 95 per month we sold last year.

5th Edition Reference Book Update

Although we cannot estimate the date of publication at this time, we continue to make progress on preparing for the publication of the 5th Edition of *On-Site Power Generation: A Reference Book*. Because they had already demonstrated their knowledge and expertise, authors who had written chapters in previous editions have been given instructions to start writing their chapters. Many authors that have not previously written for EGSA have been asked to submit their credentials and a "vision statement" for the chapter that they propose to write as part of the "Author Selection" process. The Author Selection Committee, using a "blind" and objective process, rates each author, and that rating is used to select the best author or co-authors for a given chapter. That process is well underway and the committee is currently engaged in reviewing prospective author credentials.

However, there are a few chapters for which we have not yet identified authors or for which we do not have a firm commitment. If you think that you might be able to help us identify authors, please contact George Rowley so that you can learn which chapters lack authors.

If you have questions or comments about EGSA Education programs, please contact George Rowley, EGSA Director of Education *G.Rowley@EGSA.org* or 561-237-5557. ■

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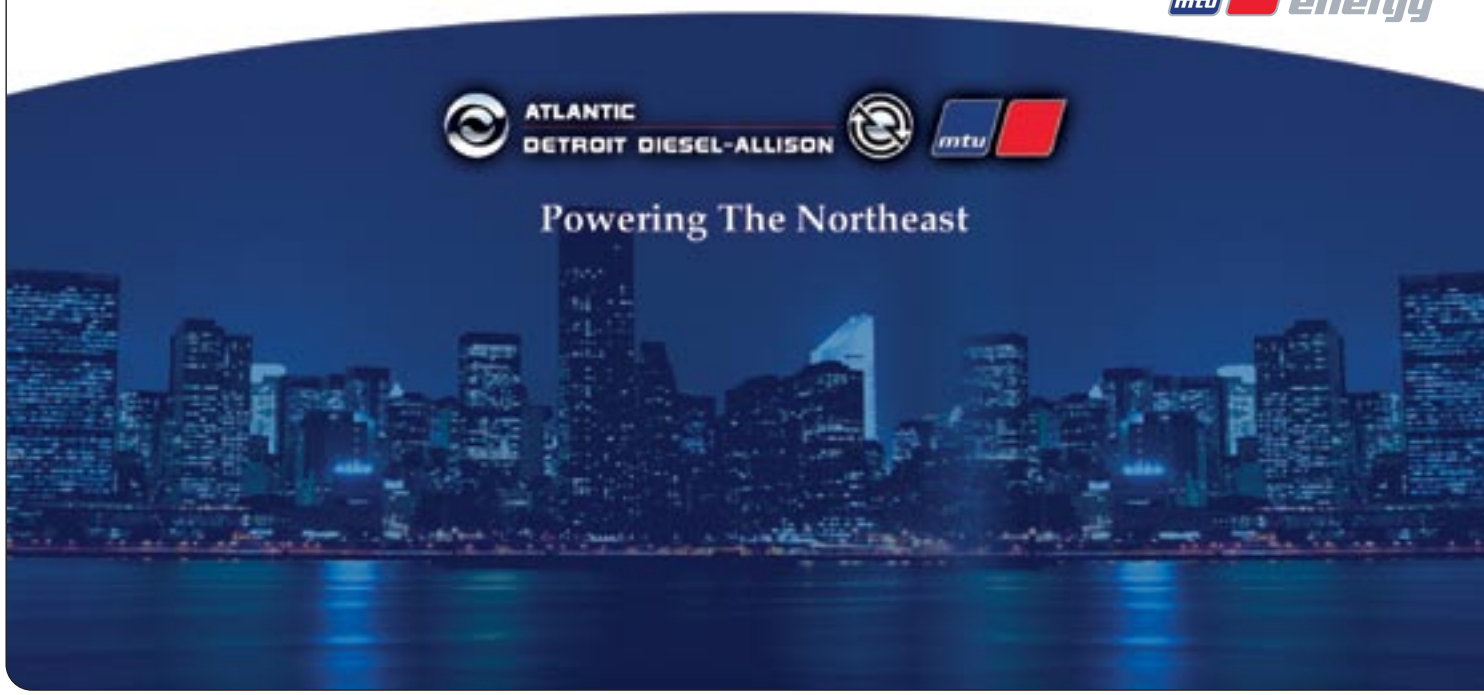

Herb Whittall
EGSA Technical Advisor

EGSA Convention is Timely, Lively

The recent EGSA Convention proved to be lively, informative and very timely. I found Andy Karsner, former Assistant Secretary in the Office of Energy Efficiency and Renewable Energy, to be the convention's most interesting speaker. His presentation gave one hope that the U.S. will soon develop more renewable energy resources.

Codes and Standards Committee

The Codes and Standards Committee again reviewed the work on the problem of meeting the IBC Seismic Requirements and approved a draft EGSA Recommended Practice that outlines how to meet these requirements. EGSA will issue *Recommended Practice for Seismic and Wind certification for Compliance to the International Building Code for Electrical Generating Systems and Various Critical Components for Building design Categories C, D, E or F per Chapter 13 of ASCE 7* later this year under the number 200W-2009.

The newest edition of all the ICC standards has been published. You can purchased them at *www.iccsafe.org/2009icodes3*. The January/February edition of the *Journal* discussed two webinars taught by David A. Panella that help participants understand the impact of complex wind and seismic loads on new or renovated structures. Panella is an expert in the 2006 IBC and ASCE/SEI 7.05 *Wind Loads* and the 206 IBC and ASCE/SEI7.05 *Seismic Loads*. Information about future webinars may be found at *www.iccsafe.org/training*.

Germany has proposed a correction to ISO 8178-4:2008 *Reciprocating internal combustion engine driven alternating current generating sets – Part 4; Controlgear and switchgear*. It has to do with the F-cycle. It gives three load points, the Power at that Point, the speed at that Point and the weighting. I don't understand their second load point since such a set should run at idle or at rated load to operate. However, their second speed setting is at 60% to 75% of rated speed, a speed at which the set would never run in operation. The load at point two is given as 50% of maximum rated load.

UL has published the first edition of UL 2201 *Standard for Portable Engine-Generator Assemblies*. It cannot be issued as an ANSI Standard because it did not gain consensus approval. UL proceeded with publication because it felt the standard was needed for safety reasons. Meanwhile, UL will continue with the STP process and try to obtain the necessary consensus.

NFPA has issued the *Handbook* to accompany 2009 NFPA 70E *Electrical Safety in the Workplace*. NFPA 70E and the Handbook are "bundled" as item #E2-70ESET09 for $168.50; alone, the Handbook (#E2-70EHB09) costs $121.50. Call 800-344-3555 to order. Call the same number for information on NFPA's NFPA 70E seminars; 1.4 CEUs or 14 hours of credit is available.

Closing Notes

Herb Daugherty will represent EGSA at the IEEE Color Book meeting in Calgary in May.

I have reviewed IEC 56/1315/FDIS *Standard for Dependability* and concurred with others on the US TAG to TC 70 panel that this document is unnecessary and very vague. I voted to disapprove the document. ■

Opportunities Abound in Stimulus Funding

By Greg Linton, 2009 EGSA President

When President Obama signed the American Recovery and Reinvestment Act (ARRA) in February, it signaled the start of one of the most ambitious Federal Government programs since President Franklin D. Roosevelt rolled out the Works Progress Administration (WPA) during the Great Depression. With the stroke of a pen, Obama released billions of dollars in stimulus aid that, in turn, were rapidly used to fund a wide range of programs across a variety of industries—including those in the energy sector—and stimulate the flagging U.S. economy.

The ARRA stimulus package is so ambitious, in fact, that each state has established a "recovery" office to provide points of contact for those agencies, companies or individuals seeking funding. With billions of dollars earmarked for recovery and a short 2009-10 timeline in which to spend them, it was imperative that program and project details be immediately available.

EGSA Member interest in ARRA and its potential to provide new business opportunities made it clear that EGSA needed to act quickly to ensure that all eligible EGSA Member firms had the information they needed to access applicable ARRA program opportunities.

To that end, the EGSA Executive Committee and Board of Directors commissioned High Velocity Communications to conduct a "short fuse" research and data reporting project to help identify ARRA funding opportunities for specific energy-related programs and compile the information for member distribution. The project found that $32.7 billion in stimulus money has been earmarked for Department of Energy (DOE) programs under ARRA, some of which have the potential to directly benefit EGSA-Member firms and their customers.

Two programs should be of particular interest to EGSA members. The Energy Efficiency and Conservation Block Grant (EECBG) program, part of the State Energy Programs (SEPs) and funded by the ARRA, will provide formula grants to improve energy efficiency and reduce fossil fuel emissions in a variety of projects. For example, ARRA funding will support projects that reduce and capture methane emissions from biomass and landfill gas applications; install renewable energy for government buildings; advance combined heat and power systems; and promote district heating and cooling.

President Obama has made it clear that the development and use of domestic renewable energy resources will serve as the cornerstone of his administration's energy policy. In fact, the White House hopes to have some of these resources in place as early as 2010. Many EGSA Member companies are actively engaged in the sales, installation and/or service of equipment being used in landfill gas and biomass gas applications, wind power and other renewable energy projects. Thus, it's crucial that EGSA Members have timely federal and state contact information about ARRA funding in these areas.

Also under the ARRA, $4.5 billion has been allotted to the Office of Electricity Delivery and Energy Reliability. As outlined in the legislation, the money will fund the agency's plan to modernize the electric grid, enhance the security of our nation's energy infrastructure and ensure the reliable delivery of electricity to meet growing demand.

Contact information for energy-related state and federal programs receiving ARRA funding was compiled into an easy to read Microsoft Excel spreadsheet and posted on the EGSA website. EGSA Members received a link to the document via e-mail on April 24. EGSA-Member firms are encouraged to use this information to contact the appropriate state or federal agencies and determine if they or their customers are eligible to access these funds.

EGSA commissioned a second report on ARRA stimulus funding related to the Diesel Emissions Reduction Act (DERA), better known as the National Clean Diesel Campaign. This existing EPA-funded program delivered an additional $1.73 million of stimulus funding to each of the 50 states. This information (also compiled in a Microsoft Excel spreadsheet) was posted to the EGSA website and EGSA Members were provided with a link to the document via e-mail on April 17. The deadline for applying for that installment of program funding expired on April 28. However, EGSA is presently encouraging its members to participate in a campaign asking Congress to fully fund DERA with $200 million in FY2010 and provide an additional $270 million for state and local air quality grants.

More information on these funding lobbying efforts—plus information on $60 million in DERA FY2009 funding and an additional $15 million specifically for the State of California which will be released in late summer—will be available via EGSA Action Alerts, the EGSA website (*www.EGSA.org*) and the next issue of Powerline magazine. Stay tuned as EGSA continues its efforts to enhance the value of EGSA membership. ■

Stay on Top of Your Game with EGSA's Electrical Generator Systems Technician Certification Program

Think things move pretty fast in today's business world? Think how fast they'll be moving one, five or even 10 years down the road. That's why you need every advantage to stay on top.

It's no secret that technology is becoming more complex—not less—and that makes today's On-Site Power Generation System a lot more expensive. End-users—your customers—don't want just anybody with a basic knowledge of mechanics to install and maintain their equipment. They want to be confident that all work has been performed by qualified personnel. Suppliers want assurance that skilled technicians are performing maintenance and repairs to guard against unnecessary returns or warranty repairs.

As Good as Your Word

In the past, your word was the only assurance that your technicians are skilled and knowledgeable. But now, through EGSA's Electrical Generator Systems Technician Certification Program, there is a way that you can back up those words with objective evidence of your technicians' proficiency.

EGSA offers you a big advantage: For the first time in our industry, we have an objective and accurate way to determine generator technician proficiency. That means that the same standards will be used to measure the skills and knowledge of technicians from Maine to Manitoba and Mexico. Yes, Manitoba and Mexico! EGSA has determined that there is no reason why the test could not be fairly applied to any NAFTA technician.

What are the Benefits?

For the Employer, certification helps ensure that your technicians have the critical knowledge and skills to succeed in their jobs. And everyone will be comfortable knowing that your certified technicians' expertise has been confirmed by *the* industry organization through a program that was developed by a university. Encouraging and helping your technicians become certified signifies your commitment to the highest of standards. Plus, it lends an added level of credibility to your firm and can sharpen your competitive edge. Employing certified technicians will promote customer satisfaction and you won't have to be shy about offering assurance that your technicians are qualified. Certification can also help you select potential new hires, analyze job performance, evaluate employees and motivate technicians to enhance their skills and knowledge.

Think about the message that certification sends to those with whom you do business. Why would anyone want a technician who isn't certified performing critical maintenance or repair tasks? Employing certified technicians gives you an added tool with which to market your business.

As our members have said, "We've seen too many backyard mechanics damage expensive equipment. This program will provide credibility for my company and will help build pride and a commitment from technicians to be the best."

For the Technician

Certificate holders benefit too. Certification shows employers, clients, and associates that you are committed as a professional. It provides recognition of your knowledge and skill, shows your commitment to your profession and can help with job advancement. Certification is a mark of excellence that you carry with you everywhere you go.

Acquiring certification indicates that you have the knowledge and proficiency required to perform as an Electrical Generating Systems Technician professional. Becoming certified can increase your salary, enhance your skills, and make your job more satisfying.

Certification helps ensure that your technicians have the critical knowledge and skills to succeed in their jobs.

The Certification Test

EGSA collaborated with Ferris State University to develop the certification test and program. Through a scientific process, our panel of technical experts identified 12 duty areas (such as "Basic Electricity") and 61 tasks (such as "demonstrate knowledge of AC electrical theory") within the duty areas. The duty areas and tasks were ranked and rated in terms of their relative importance, the frequency with which a task is performed, and skill level (i.e. Senior/Expert; Intermediate; and Entry Level.) All this data was combined to develop the certification test that was then statistically validated through a pilot test taken by generator technicians from across the United States.

Who can take the Test?

There are no pre-qualifications for taking the EGSA Certification test. We recommend three or four years of field experience before taking the test. Technicians who have had formal education in On-Site Power Generation (a degree or certificate from a technical school or community college) may need less field experience. Those who pass the test will have a comprehensive knowledge of basic electricity, the functions of a gen-set's mechanical and electrical components, the interactions and relationships among components and an understanding of various elements of the installation, service, maintenance, and repair of gen-sets and On-Site Power Generation Systems.

Certification Testing Covers:

- *Automatic Transfer Switches*
- *Communication & Documentation*
- *Engine Generator Instrumentation & Controls*
- *Multiple Generator Switchgear & Controls*
- *Troubleshooting System Problems*
- *Auxiliary Support Systems*
- *Basic Electricity*
- *Prime Movers*
- *Governors*
- *Voltage Regulators*
- *Generators/Alternators*

Use the Study Guide to Prepare!

Use of the program's Study Guide is an excellent way to help technicians prepare for the test and should clearly indicate if they are ready to take (and pass) the certification exam. In addition to useful formula pages, the guide contains almost 200 multiple choice practice questions that cover all parts of the certification test. In addition to identifying the correct answer, the guide also indicates in most cases why a particular choice is correct and why the others are incorrect. The Guide also identifies resource material where technicians can get additional or more in-depth information about a given topic.

Need more information? Visit us online at *www.EGSA.org* to find extensive and detailed information about the certification program. Or contact EGSA Director of Education George Rowley via e-mail at *G.Rowley@EGSA.org*.

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Raising the Level of Control – Moving to Advanced Power Management

By Steve Evans, CEO and General Manager of DEIF's North American operation

If you were in a hospital in South Florida in hurricane season, you might just find it comforting to know that the emergency power system works! Last winter, the University of Miami's Miller School of Medicine opened a new ten-story, 500,000 square foot expansion facility, with parking for 1,400 cars and 15,000 square feet of retail space. South Florida's notoriously hot climate and such a large building required the second largest chilled water plant in Florida and a major upgrade to its emergency power system. The ground floor parking garage is hurricane proof and filled with the chilled water plant and three 2.8 MW Kohler 2800REOZDB diesel generators, with room for two future units.

"The facility was built on-time, within budget, and will provide the medical school with emergency power for many years to come," said Mark Schwartz, Sr. Project Manager, Facilities Design and Construction for the University of Miami's medical campus.

The entire building is state of the art and fully compliant with the university's green building standards. Ron Bogue, Assistant Vice President for Facilities and Services at the Miller School of Medicine, says it may contain the only green cooling tower in the whole of South Florida. The gensets, switchgear and control systems are designed to bring all three generators on line within ten seconds in the event of an outage to meet the requirements of NFPA 110. Approvals are pending to allow these generators to respond to requests from the local utility for load shedding during high demand periods or peak shaving to limit demand charges.

"The new facility at the Miller School of Medicine is quite a place," says Greg Porter, Senior Project Manager for Elcon Electric Inc. of Pompano Beach, FL, the electrical contractor on the job. "There is nothing like it in Florida."

The Miller School of Medicine's massive new building is using a new twist on an old fashioned technology, thanks to the latest generation of control systems that utilize the power of the micro processor to execute advanced power management features.

Evolution of Control Systems: Power Generation Isn't Just For Utilities Anymore

A combination of factors over the past decade has led to a boom in decentralized power production and renewable energy sources in order to meet the nation's growing electrical demand in an environmentally conscientious way. These include a measurable shift in environmental awareness leading to greater use of cogeneration/combined heat and power systems and green energy sources. In the past, utilities were the only companies allowed to sell electricity commercially. However, the liberalization of the power sector that started with the first energy crisis in the 1980s is now opening up generation to entities other than traditional public utilities.

Greater demand now exists for emergency power plants, as data centers, hospitals, and many industrial processes require uninterruptible power sources. Even smaller businesses and some homes have On-Site Power generation. Addressing the lack of widespread utility acceptance of IEEE 1547 intertie standards and billing standards is the next critical step to enable many more co-gen and combined heat and power systems to come onto the grid.

In order to be remotely controlled and dispatched by the utility network as either an Interruptible Rate Plan generator or as cogeneration, the control of decentralized and emergency power plants demands highly advanced and very specialized technology. Utilities often offer a lower year-round rate, typically known as an Interruptible Rate Plan, if the consumer agrees to be off the grid within a short period of time. Co-gen sites parallel with the utility for extended periods of time in various modes including peak shave, import/export control, base load, or zero power transfer modes. To start these units, they must also be able to communicate with external control systems using a range of protocols: from the common industrial

The University of Miami's Miller School of Medicine recently upgraded its emergency power system with 2.8 MW Kohler diesel generators and control solutions from DEIF.

protocols such as serial MODBUS, Profibus and CAN-open to the more advanced TCP/IP Modbus or GSM modems and integrated web servers that allow data to be communicated over the Internet, cell phone, or satellite systems.

Systems like the one at the University of Miami rely upon new, easy to use, advanced power management systems. Rather than being limited by equipment design with older discrete components, the software can be easily customized to meet the unique needs of a particular location. Then changing power management functionality is a simple matter of updating the programming or settings. While the ideas are not new, technological advances have highly automated these control systems and replaced the discrete components like synchronizers, load share modules, power factor/VAR controllers, PLC's, and protective relaying devices with integrated controllers capable of all these functions in one 'box'.

This latest generation of digital genset controllers gives operators greater control over the operation and safety of the gensets, helping to improve fuel efficiency and reduce emissions. Since they have fewer components and less wiring than older analog systems, they require less maintenance and have a higher MTBF (mean time between failure).

One more key factor facing the power industry is the severe shortage of experienced personnel. It is often a requirement

to make the control system as robust and easy to operate as possible by automating such things as synchronizing and load management—tasks that used to be done by hand. Today's advanced systems can interface to multiple models of gensets, even from multiple vendors, thus decreasing the learning curve for operators. This makes it faster to spot problems, easier to train personnel, and safer for equipment and personnel.

Three Levels of Control

There are three levels of controls in a complex power generation system.

Level 1: Level 1 consists of the control systems located on the engine. The Engine Control Unit or Engine Control Module (ECU/ECM) provides the basic functions for the single engine, including primary engine protection, crank/start/stop control, fuel management, injector and emissions control. These systems have grown in complexity due to more stringent emissions requirements.

Level 2: The second level, traditionally located at the generator switchgear, includes synchronization, active and reactive load sharing, power factor control, primary generator protection and sometimes back up engine protection (this is a requirement in the shipping industry, for example). With several discrete components, this historically took a complete switchgear section, lots of wiring, and extra labor.

Level 3: The third level controls are typically located at the utility tie point circuit breaker and are often done by a PLC, or, in older systems, analog devices and control relays. Add to this the protective relaying, and another section of the switchgear would be dedicated to the intertie controls. The functionality is limited only by the programmer and the budget, and might include:

(1) Peak shave, electrical demand cost control.
(2) Import/Export control.
(3) Run time management or generator priority.
(4) Close Before Excitation.
(5) AMF/ATS (automatic mains failure/ automatic transfer switch) operation.
(6) Fuel optimization.
(7) Load dependent start/stop and Heavy Consumers management.
(8) Load shed/load add.
(9) Multiple utility or main breakers and tie breakers.
(10) Remote Control/Remote Monitoring.

Today's advanced controls can combine all three levels of control into one device often called an advanced power management controller. Modern electronic engines dictate that the proprietary Level 1 control must be done by the ECU/ECM on the engine. With the ECU/ECM on the engine and the Level 2 and Level 3 controls in the advanced power management controller at the engine/generator or at the switchgear, the switchgear can be much simpler with reduced wiring, programming, and construction costs.

Let's discuss each of these functions in more detail and look at some real world applications that utilize a modern automatic power management system.

Peak Shave & Import/Export Control

With real time data on electrical market conditions, generator owners can cut their utility bills by switching to their own generation during afternoon peak periods, thus saving demand costs or even become

DEIF designed its power control solutions to operate in harsh environments with temperatures between -30°C and + 75°C.

a revenue source by selling power back to the utility. Participating in such markets requires control systems that can respond to a signal from the utility or market operator. The new digital controls can communicate with a host computer to automate the starting, synchronizing, and ramping up the power produced to make a fast, unattended, and smooth transition.

Run Time Management

Run time management is the replacement for what used to be called run time equalization. With run time equalization, the use of multiple gensets was monitored and managed so they were all run approximately the same amount of time. While this approach solved some problems by preventing the early demise of over utilized units, it created another: all generators required maintenance at the same time. The trend now is to manage the run time so that certain machines accumulate the hours first and hit their preventive maintenance (PM) intervals before the other units. Then, while that genset is undergoing maintenance, the other gensets with lower usage can reliably take over the load. This approach staggers the maintenance work and expenditures, ensuring that at any given time there are more machines available for use that are not approaching the end of their maintenance schedule.

Close Before Excitation

When multiple generators need to be brought online at one time, established operating methods dictate they be synchronized one at a time to each other. Sometimes, however, that is not an option. NFPA 110: *Standard for Emergency and Standby Power Systems* requires that critical facilities such as hospitals have their emergency power online within ten seconds. This is impossible to achieve when the critical load demand exceeds the capacity of one generator under that operating protocol.

The only way to achieve this quick response is to use an old method of synchronizing gensets where the prime mover is started and the circuit breaker is closed right above crank speed, connecting the generator to bus with the excitation off. As the speed approaches synchronous, the excitation is turned on and the generator pulls into sync as the voltage builds up. Then the generator is gradually brought up to rated output. The University of Miami, for example, simultaneously brings three gensets fully online within ten seconds using this method. Close before excitation might require an extra component or two to turn on the excitation, but the control feature can be embedded into an advanced power management controller. Also, multiple controllers can talk to each other to start up to 16 gensets simultaneously using this method. No extra control systems are required.

AMF/ATS

For NFPA 110 compliance, the controllers can execute the control functions needed to operate with Automatic Mains Failure/Automatic Transfer Switch systems. All that is needed in addition to the controller are external power switching devices like circuit breakers or contactors. When there is a utility or mains failure, the transfer switch will signal the generator(s) to start then switch to the emergency generator power when available.

There are four different types of transfer schemes: open transition; close transition; 100 ms or closed transition; and extended parallel operation. In an open transition transfer switch, the generator and the utility remain isolated: the switch breaks the connection with one power source before connecting the second. Close transition systems can either use active synchronizers to pull the generator in sync with the utility or simply wait until they drift together so the switches can swap sources very quickly, often fast enough not to drop out motor controls. Closed transition switches, also called in sync transfer, keep the utility and the generator contacts running in parallel for extended periods of time. A variation on this is the momentary closed transition, or "100ms parallel", that will parallel sources for a maximum of 100ms, preventing motors from stopping or lights flashing before opening one of the switches. 100ms is short enough that control systems and utility agreements can be simplified.

Fuel Optimization

Oil prices have dropped sharply from the $150 per barrel they were running last summer and natural gas prices have also fallen, but that doesn't mean anyone can afford to waste fuel! Fuel optimization systems can maximize efficiency by running engines at their most efficient level, only running the minimum number of engines for the required load and paralleling different size gensets. Fuel optimization will, for example, run one generator when the system demand is at one level. As the demand increases and another generator is required to handle the load, the fuel optimization controls will decide which generator or generators can provide the best fuel economy to meet the demand, automatically starting and stopping engines as needed. Most of the engines are run at their optimum efficiency point and one is left to handle the remaining load, not equal loading like standard load share systems.

On the ship Kommandor Subsea 2000, this means getting better fuel efficiency out of its five generators: two 840 kW Cummins KTA 38; two 450 kW Cummins K19 D1 and one 300 kW Cummins NTA 855 G-M engine. The generators power all the propulsion motors: two 600 kW main propulsion motors, one 400 kW stern tunnel thruster and two 400 kW bow tunnel thrusters. A loss of power could mean disaster. *(See the Kommandor Subsea case study opposite.)*

The Kommandor Subsea 2000 is a 78 meter long, 2500 ton, ship that operates in the North Sea as a support vessel for a remotely operated submersible vehicle (ROV) rated for depths up to 3000 meters. The ROV carries out pipeline inspections, oil rig underwater structural inspections, supporting pipe-laying operations and other very complex tasks. Propulsion is only from electric motors powered by the 5 generators on board; obviously a reliable power supply is top priority.

As the vessel sometimes operates as close as 10 meters from the legs of oil rigs, all equipment must operate efficiently with backup systems in place should something go wrong. The systems must always have enough power for the vessel to move safely away from the platform. Moreover, the maintenance of the systems must be to a very high standard as they need to comply with the many requirements in the various regulatory agencies.

"It is vital for us that the PMS [Power Management System] is reliable," said Neil Brown, the ship's chief engineer. "A loss of power while the vessel is alongside a platform holds the potential for a major disaster. A blackout would endanger the personnel onboard and could result in the loss of the vessel."

To hold its position near its target the ship uses a Dynamic Position (DP II) system—a computerized system of controlling a vessel's propellers and thrusters to automatically maintain the ship's heading and position via GPS. To ensure reliability and improve efficiency, the PLC-based power management system (PMS) was replaced with a DEIF Delomatic advanced power management system.

Among other advantages, the new system starts and stops the engines as required in auto mode, activates the DP II at the touch of a button, does not allow fewer than the requested number of generators in operation, and synchronizes, load shares and maintains at least three generators while in DP II mode.

In case an engine's pre-warning alarm is activated, the PMS automatically starts up a standby engine before shutting down the faulty engine. Should a switchboard load exceed nominal load, the system starts up an extra engine using load dependent start. The system detects any switchboard failure and deselects the faulty section, and it features blackout prevention.

"All in all it's a pretty good piece of equipment," Brown said.

Since the new PMS continually monitors the load and generators to maximize efficiency, the Kommandor Subsea's owner, the British firm Subsea 7 Limited, reports a 12-30 percent reduction in fuel consumption since the new system was installed.

"Not only does it help us cut back on fuel, it also reduces engine running hours which saves a lot of money on engine spares required," said Brown. ■

Load Dependent Start/Stop, Heavy Consumer Management, and Load Shed/Load Add

Load dependent start/stop, heavy consumer management, and load shed/load all function basically the same way—regulating the spinning reserve—load dependent start/stop and heavy consumer management dealing with the starting and stopping of the generators and load shed/load add dealing with switching loads off and on.

First, by controlling the generators: like fuel optimization, increased efficiency has payoffs in fuel costs, environmental impacts (carbon footprint, waste heat), engine life, and maintenance. The basic principle is to only run the generators necessary at their most efficient level to handle the load. In older systems, load dependent start/stop automatically added or subtracted generators as the frequency changed. Today's automatic controllers regulate the spinning reserve, the difference between the total load kW and the kW available from each generator, holding the frequency constant. They must know the kW from each generator and the expected kW from each load in order to function at their best.

Heavy consumer management effectively increases this spinning reserve set point to allow large loads to be started. A start request is issued that raises the spinning reserve set point, thus starting generators as necessary. When there is sufficient spinning reserve, the load is allowed to start.

The other side of the coin is managing the load, including ensuring that the higher priority functions are kept running when there is not enough power available to service all loads. The advanced power management system manages loads in a priority, dropping lower priority loads when the spinning reserve drops and keeping the higher priority loads energized. If there is no load shed function, the entire system could collapse due to under-frequency, much like the August 2003 outage in the Northeast U.S. and Canada.

Multiple Mains and Ties

As more organizations are installing connections to multiple utilities to improve uptime, the power management systems must be able to monitor and control multiple main breakers and tie breakers, as well as the backup generators when neither main is functioning. Advanced power management provides an integrated, simpler, faster and more reliable means of controlling multiple main and tie breakers than older PLC based systems.

For example. in February 2009, Kolding Hospital, a 300-bed facility in Kolding, Denmark, commissioned a multi-mains control system. This control system includes five Automatic Genset Control (AGC) units to monitor, control and protect the five incoming mains, two AGC units for the two 1.4 MVA emergency generator sets, and special unit for the bus tie breaker.

Remote Control/Remote Monitoring

Although modern advanced power management controllers can control the entire critical power system, a host computer often monitors the power system for faults, alarms, or status updates. This is not a new concept, but technological advancements are making this easier and opening up more possibilities. Rather than relying on analog phone lines, the latest systems can operate the plant via secure Ethernet or even worldwide on the Internet. MODBUS

is a technology that is almost 40 years old, still widely in use today, but now can cover greater distances using fiber optics than the old 485 twisted-pair copper standard. CAN bus communications are fast becoming the new standard with broad acceptance. The use of radio frequency (RF) links between the I/O and the controller and between the controller and the Human/Machine Interface (HMI) has also gained popularity as a way to reduce wiring costs.

When Maersk Oil & Gas wanted to commission a Power Management System for the DAN-F oil platform complex in the North Sea, for example, it specified a single advanced power management system that would share loads between one diesel generator, seven gas turbine generators and 12 bus tie breakers on three interconnected platforms. A traditional approach would have featured analog governor technology, 1–5 Volt DC signals and individual controls at each genset. In practice, the 1-5 Volt signals were unusable due to the distances and grounding issues between the three platforms.

The answer in this case was to install a digital solution featuring advanced power management controllers 'talking' on a local area network interconnected to the customer's SCADA software. All power management controllers, including kW and kVAR share, are on this same digital network. An HMI visual display unit is connected to each genset, offering the operator a complete plant overview of the power system and the ability to control any generator from any HMI. Software in the controllers detects a loss of the network and shifts the systems to the old "isochronous droop" mode, thus keeping the system operating if the network should fail.

Bringing Out the Best

Many customers are demanding more complete control over generators and their entire operating environment, as well as the capability of taking part as a distributed energy provider in a deregulated market.

"The distributed generation part of the market has taken off tremendously for us and the entire industry," says Tom Ferry, Sales Manager for Kohler, WI-based Kohler Power Systems' Americas-Systems Group. "Nobody wants power plants built in their areas, therefore utilities and end-users are looking to this type of project for the potential to assist in demand reduction. Approximately 50 percent of the projects we design now have the capability to parallel to the utility."

Advanced Power Management systems give operators greater flexibility in designing systems to meet their own particular needs, yet this is only a small sampling of what can be achieved. Utilizing "the power of the processor" offers many benefits and features—cut fuel consumption, boost efficiency, improve reliability, increase functionality, improved flexibility, ease of use, reduce maintenance costs, and even create new revenues—today's new advanced power management control systems can bring out the best in your power system. ■

About the Author

Steve Evans is the CEO and General Manager of DEIF's North American operation based in Fort Collins, Colorado. He has been in transmission, protection, generation, distribution, conversion, and control of electrical power for over 28 years.

Seismic and Wind Requirements for Power Generation Equipment

By Aniruddah Natekar, Sales Application Engineer, Cummins Power Generation

The International Building Code (IBC) provides an up-to-date building code addressing the design and installation of building systems through requirements that emphasize performance. Published by the International Code Council (ICC), this comprehensive code establishes minimum regulations for building systems using prescriptive and performance-related provisions that combine the scope of previously dominant codes, such as BOCA and ICBO Uniform Building Code (UBC).

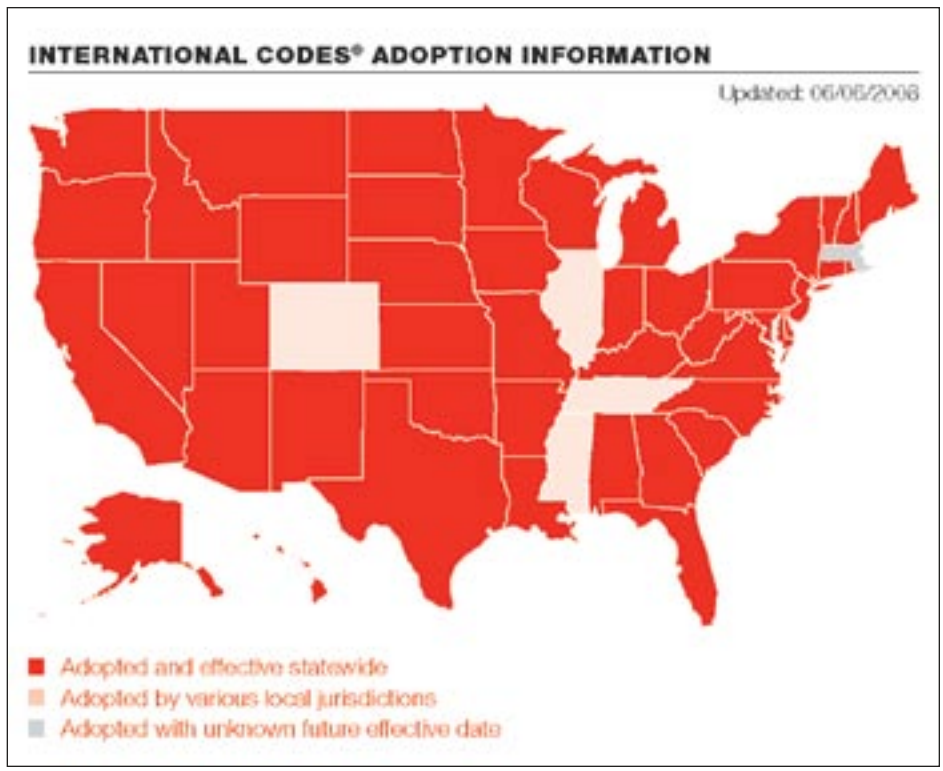
Provided is a summary of the earthquake (seismic) and wind provisions affecting power generation systems that are included in the International Building Code (IBC). For designated building functions, the IBC can require that systems critical to life safety and fulfilling the building's intended purpose remain online immediately after a seismic event. This can affect the backup and emergency system, requiring the system be compliant for the same seismic design category as the building.

For buildings designated as critical, any system required to fulfill the intended use is also covered. Additionally, the code states that a failure of any component shall not cause the failure of any essential component. If a generator set is essential for life safety functions, to protect life safety functions, or for a building to fulfill the intended use; it must be certified compliant to meet the same seismic design category as the building.

As of 6/6/08, the IBC has been *(see Figure #1)*:

- Adopted & Effective statewide: 44 states plus Washington DC
- Adopted by various local jurisdictions: MS, DE, CO, IL, TN
- Adopted with unknown future effective date: Massachusetts

Old (UBC) building codes referenced seismic zones 0, 1, 2a, 2b, 3 and 4. The seismic design force for equipment installation was the same regardless of where you were located within the zone. With the IBC Code, the zones are no longer valid. The U.S. Geological Survey has now mapped the ground accelerations throughout the United States and has assigned various values. Calculating the seismic design force for equipment attachment and equipment selection is now based on these new mapped accelerations (called Short Period Spectral Response Acceleration). Specifying engineers must now reference these values in equipment specs and not the old UBC Zones.



International Building Code adoption information (Fig. #1).

The IBC Code also incorporates wind regions. For states that have adopted the IBC 2006, the requirements are that equipment must be attached to the building to handle the overturning forces of wind and must remain operational after being exposed to these wind conditions. For states that have not adopted the IBC 2006, only proper attachment is required.

Liability Concerns

The various versions of the IBC codes hold architects, engineers, contractors and equipment manufacturers responsible for the design and installation of buildings and their corresponding MEP (mechanical, electrical and plumbing) systems. As a state adopts a version of the building code, it becomes the law governing construction within the state. Accordingly, professional licenses are potentially at risk for those that do not adhere to the requirement of the law. The focus of the IBC codes is on building performance. The logic is that if MEP systems are designed to the same seismic design force as the building itself, then those MEP systems will continue to operate after a seismic event.

The registered design professional in charge shall state the applicable seismic qualification requirements for designated seismic systems on the construction documents. Each manufacturer of designated seismic system components shall test or analyze the component and its mounting system or anchorage as per IBC 1708.5. Submissions include not only a certificate of compliance, but also installation drawings for review and acceptance by the registered design professional. Qualification shall be by an actual test on a shake table, by three-dimensional shock test, by an analytical method using dynamic characteristics and forces, by the use of experience data (i.e,

historical data demonstrating acceptable seismic performance) or by a more rigorous analysis providing for equivalent safety.

IBC and Seismic Requirements

The IBC increases the design professional's responsibility by adding seismic reviews to the standard building structure design and review process. The code requires building life safety systems remain online immediately after a seismic event. For buildings designated as critical, any system required to fulfill the intended use is also covered.

Seismic-compliant products must be reviewed and certified as capable to withstand a given seismic force by an independent approved agency. The equipment must withstand specific seismic forces (Fp) on a three dimensional shake table shock test, analytical method using dynamic characteristics, use of historical data, or more rigorous analysis providing for equivalent safety. (IBC 1708.5). Additionally, Section 1702 of the code states that when required by the design professional, a label must be applied to the product that indicates it has been inspected and evaluated by an independent approved agency. The IBC outlines the requirements for an independent approved agency in Section 1703.

A typical emergency power system includes an automatic transfer switch, a generator, a battery to start the generator, and associated wiring and ventilation connections. Under the IBC, each piece of equipment within the emergency power system must be seismically certified and wind certified, in locations where that requirement applies.

Generator sets are most susceptible to earthquake-related damage at the points where components—including the engine exhaust system, fuel lines, AC power-supply wiring, load wiring and control wiring—interconnect.

These connections must be flexible, so relative motion can be absorbed without damage. Without this flexibility, the building or generator set may be damaged and the generator may fail while in service. Additionally, when vibration isolation is required in a seismic application, seismically certified vibration isolators must be used to ensure the generator set isn't dislodged from the building structure during the seismic event.

It is worth mentioning here that the design force for a piece of equipment mounted on the roof is about three times greater than that same piece of equipment mounted at grade. This means that the generator set and the attachment of the equipment to the building structure need to be capable of handling these higher design forces. The vibration isolators must be selected based on the weight and center of gravity of the equipment, the type of foundation where the equipment is being installed (concrete or steel), the location within the building where the equipment is located and the ground accelerations for the location as outlined in the code.

To ensure a manufacturer's generator sets can survive a seismic event, Section 1708.5 of the IBC outlines the criterion for testing equipment for IBC compliance which may include shake table testing, structural modeling, or a combination of both.

Shake-table testing involves placing the generator set or component onto a shaker table where the equipment is tested in three

different axes. The table creates random movement that is monitored to validate that frequency and forces simulate those of an earthquake. Generator sets are subjected to a range of different tests charting various performance characteristics under different potential operating conditions. The analytical method uses software to simulate the dynamic characteristics and forces of wind and seismic events and evaluate capability of the system to withstand those. Units that pass these rigorous evaluations are considered to be seismically certified. The test standard as outlined in the IBC codes is ICC-ES-AC 156.

The IBC 2006 requires that generator sets meet the wind-load requirements specified for the installation location. The U.S. is divided into a number of wind zones, according to the highest wind speeds occurring in those zones due to hurricanes or other storms. Performance testing, mathematical modeling, or a combination of both, are required to certify equipment can perform during and after such events.

In jurisdictions following either the 2000 or 2003 edition of the IBC, manufacturers of "designated seismic systems"—including generator sets—must supply both a certificate of compliance to the code's seismic requirements, along with equipment labeling that contains the name of the approved agency that performed the certification testing. In the 2006 edition, the reference to equipment labeling was removed. Manufacturers still must supply a certificate of compliance for seismic and/or wind (when required), based on testing and/or mathematical modeling.

Determining Requirements

Depending on the version of the code, there are two different seismic design category charts to be referenced. However, the methodology used for determining the seismic design category remains the same for all versions of the code.

Four steps are required to determine whether the genset must comply with the seismic-resistance provisions of the IBC:

1. Determine the seismic use group or occupancy category depending on the version of the code.
2. Determine the component importance factor (Ip) of the equipment.
3. Determine the seismic design category of the structure.
4. Determine if the genset or transfer switch is exempt from seismic requirements.

The specifying engineer should include this information in the equipment specs.

1. Determine the seismic occupancy category. The international building code lays out this classification on the intended use of the structure. In the 2006 version of the code, these categories are clearly defined in Table 604.5 Occupancy Category of Buildings and Other Structures. *(See table below.)*

Table 604.5 Occupancy Category

Category	Nature of occupancy
I	Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to: Agricultural facilities; Certain temporary facilities; Minor storage facilities.
II	Buildings and other structures except those listed in Occupancy Categories I, III, and IV.
III	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: • Covered structures whose primary occupancy is public assembly with an occupant load greater than 300; • Buildings and other structures with elementary school, secondary school or day care facilities with an occupant load greater than 250; • Buildings and other structures with an occupant load greater than 500 for colleges or adult education facilities; • Health care facilities with an occupant load of 50 or more resident patients, but not having surgery or emergency treatment facilities; • Jails and detention facilities; • Any other building or structure with a occupant load of greater than 5,000; • Power-generating stations, water treatment for potable water, waste water treatment facilities and other public utility facilities not included in Occupancy Category IV; • Buildings and other structures not included in Occupancy Category IV containing sufficient quantities of toxic or explosive substances to be dangerous to the public if released.
IV	Buildings and other structures designated as essential facilities, including but not limited to: • Hospitals and other health care facilities having surgery or emergency treatment facilities; • Fire, rescue and police stations and emergency vehicle garages; • Designated earthquake, hurricane or other emergency shelters; • Designated emergency preparedness, communication, and operation centers and other facilities required for emergency response; • Power generating stations and other public utility facilities required as emergency backup facilities for Occupancy Category IV structures; • Structures containing highly toxic materials as defined by Section 307 where the quantity of the material exceeds the minimum allowable quantities of Table 307.1.(2); • Aviation control towers, air traffic control centers and emergency aircraft hangars; • Treatment facilities required to maintain water pressure for fire suppression.

For the 2003 version, Categories I and II are considered Seismic Use Group I; Category III is considered Seismic Use Group II; and Category IV is equivalent to Seismic Use Group III.

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Engineered to the highest performance standards and built with unmatched quality, Baldor gensets give you the power you need, when you want it.

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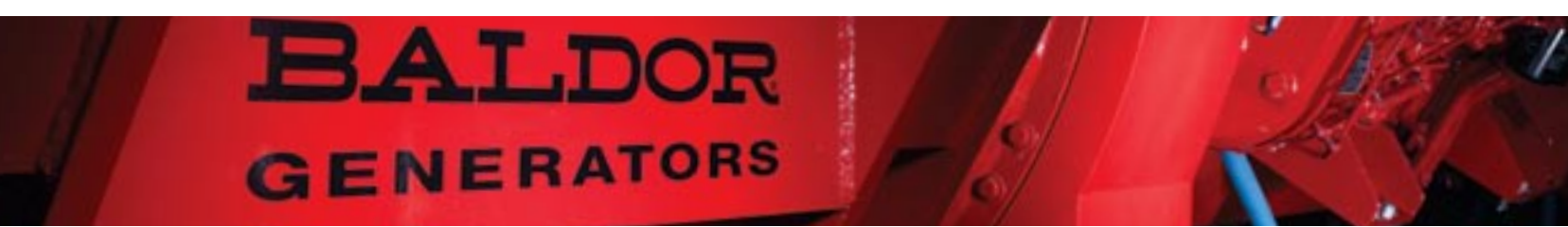


Component Type	Importance Factor
The component is required to function for life-safety purpose after an earthquake, including fire sprinkler systems.	1.5
The component contains hazardous materials.	1.5
The component is in or attached to an Occupancy Category IV structure and is needed for continued operation of the facility or its failure could impair the continued operation of the facility.	1.5
All other components	1.0

2. Determine the component importance factor: A power generation system becomes a designated seismic system based on its Ip and the building's determined seismic design category. The IBC recognizes two values for Ip as related to equipment. They are 1.0 and 1.5. Those architectural, electrical and mechanical systems and their components that require design in accordance with Section 1702.1 have a component importance factor greater than 1.0. The following Ip values, taken from the code, have been interpreted to be relevant: The code does not specifically define what constitutes a "life safety system" or critical component for determining Ip for each seismic use group.

It is the specifying engineer's responsibility to determine what Ip value will be given to a piece of equipment.

Site Class	Soil Profile Name	Average Properties in Top 100 Feet See Section 1613.5.5		
		Soil Shear Wave Velocity, $\bar{v}_s$ (ft/s)	Standard Penetration Resistance, $\bar{N}$	Soil Undrained shear strength, $\bar{s}_u$ (psf)
A	Hard rock	$\bar{v}_s > 5{,}000$	N/A	N/A
B	Rock	$2{,}500 < \bar{v}_s \le 5{,}000$	N/A	N/A
C	Very dense soil and soft rock	$1{,}200 < \bar{v}_s \le 2{,}500$	$\bar{N} > 50$	$\bar{s}_u \ge 2{,}000$
D	Stiff soil profile	$600 < \bar{v}_s \le 1{,}200$	$15 \le \bar{N} \le 50$	$1{,}000 \ge \bar{s}_u \le 2{,}000$
E	Soft soil profile	$\bar{v}_s \le 600$	$15 \le \bar{N} \le 15$	$\bar{s}_u < 1{,}000$
E	—	Any profile with more than 10 feet of soil having the following characteristics: 1. Plasticity Index $PI > 20$ 2. Moisture Content $w \ge 10\%$, and 3. Undrained Shear Strength $\bar{s}_u < 500$ psf		
F	—	Any profile containing soils having one or more of the following characteristics: Soils vulnerable to potential failure or collapse under seismic loading such as liquefiable soils, quick and highly sensitive clays, collapsible weakly cemented soils Peats and/or highly organic clays (H > 10 feet of peat and.or highly organic clay where H = thickness of soil) Very high plasticity clays (H > 25 feet with plasticity index PI > 75) Very thick soft/medium stiff clays (H > 120 Feet)		

Table 1613.5.2 Site Class Definitions

For SI: 1 foot = 304.8mm, 1square foot = 0.0929m², 1 pound per square foot = 0.0479 kPa

Site Class	Mapped Spectral Response Acceleration at Short Period				
	$S_s \le 0.25$	$S_s = 0.50$	$S_s = 0.75$	$S_s = 1.00$	$S_s \ge 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	10.
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	*b*	*b*	*b*	*b*	*b*

a. Use straight-line interpolation for intermediate values of mapped spectral response acceleration at short period S
b. Values shall be determined in accordance with Section 11.4.7 of ASCE 7

Table 1613.5.3 (1) Values of Site Coefficient F_a [a]

Site Class	Mapped Spectral Response Acceleration at 1-Second Period				
	$S_1 \le 0.1$	$S_1 = 0.2$	$S_1 = 0.3$	$S_1 = 0.4$	$S_1 \ge 0.5$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1..7	1.6	1.5	.14	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	*b*	*b*	*b*	*b*	*b*

a. Use straight-line interpolation for intermediate values of mapped spectral response acceleration at 1-second period S
b. Values shall be determined in accordance with Section 11.4.7 of ASCE 7

Table 1613.5.3 (1) Values of Site Coefficient F_v [a]

Value of S_{DS}	Occupancy Category		
	I or II	III	IV
$S_{DS} < 0.167$g	A	A	A
$0.167\text{g} \le S_{DS} < 0.33$g	B	B	C
$0.33\text{g} \le S_{DS} < 0.50$ g	C	C	D
$0.50\text{ g} < S_{DS}$	D	D	D

Table 1613.5.6 (1) Seismic Design Category Based on Short-Period Response Accelerations

Value of S_{D1}	Occupancy Category		
	I or II	III	IV
$S_{D1} < 0.067$g	A	A	A
$0.067\text{g} \le S_{D1} < 0.133$g	B	B	C
$0.133\text{g} \le S_{D1} < 0.20$g	C	C	D
$0.20\text{g} < S_{D1}$	D	D	D

Table 1613.5.6 (1) Seismic Design Category Based on 1-Second-Period Response Accelerations

3. Determine the seismic design category

All structures are assigned to a seismic design category based on their seismic use group and determined design spectral response. Use the following steps to arrive at the seismic design category for a structure.

Step 1: Determine the maximum spectral response accelerations (S_s and S_1) for the area where the structure is located.

The maximum considered spectral response acceleration at 0.2 seconds (S_S) and at 1 second (S_1) can be determined using the spectral response maps provided in the printed version of the IBC or the accompanying software which can be found on: *http://earthquake.usgs.gov/research/hazmaps/design/*

Step 2: Determine the site class (A to F) and site coefficients (Fa and Fv).

Step 3: Calculate the adjusted maximum accelerations (S_{MS} and SM_1).

Using site coefficients Fa and Fv calculate the adjusted maximum spectral response acceleration parameters at 0.2 seconds (S_{MS}) and one second (SM_1) as follows:

$$S_{MS} = FaSs * S_{M1} = Fv\ S_1$$

Step 4: Calculate the design spectral response acceleration parameters (S_{DS} and S_{D1}).

Use the values calculated for S_{MS} and S_{M1} in Step 3 to calculate the design spectral response acceleration parameters at 0.2 seconds (S_{DS}) and one second (S_{D1}) as follows:

$$S_{DS} = 2/3\ S_{MS} \bullet S_{D1} = 2/3\ S_{M1}$$

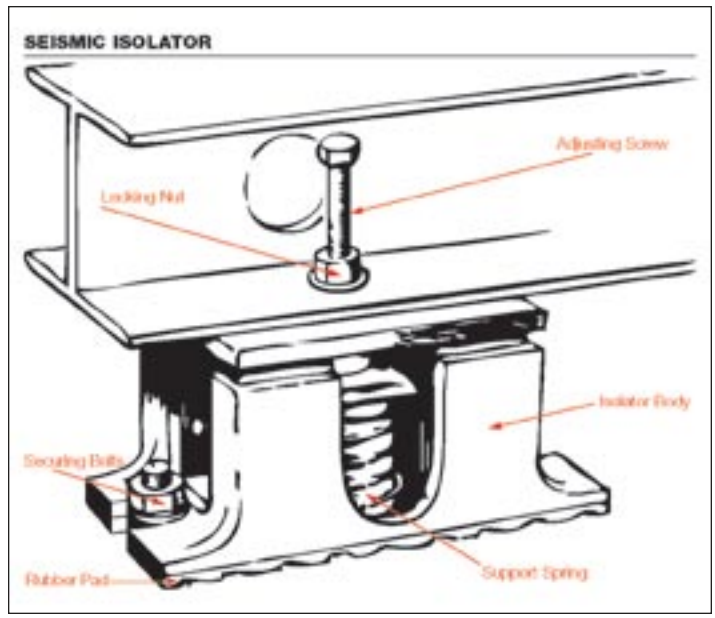
Step 5: Determine the assigned seismic design category. The seismic design category can be determined using Tables 1613.5.6 (1) or 1613.5.6 (2) in the printed IBC document and have been reproduced below. The seismic design category is a function of the structure's designated seismic use group and the values for SDS or S_{D1} calculated in Step 4.

4. Determine if the generator set or transfer switch is exempt from seismic requirements. Check for applicable exemptions. The following components may be exempt from complying with the code:

- Mechanical and electrical components in seismic design category B.
- Mechanical and electrical components in seismic design category C provided that the component importance factor Ip = 1.0.
- Mechanical and electrical components in seismic design category D, E, F where the component importance factor is 1.0 and either:

a. Flexible connections between components and associated ductwork, piping and conduit are provided.

b. Components are mounted at 4 feet (1.22 m) or less above the floor level and weigh 400 lb (1780 N) or less.



Support and isolation are the key goals of the IBC's installation requirements.

Installation Requirements

Ensuring that a manufacturer's generating equipment is seismically certified is only half the story when it comes to designing emergency power systems. Engineers also must make sure generator sets are installed to withstand referenced seismic and wind forces. So specifying the right equipment isn't enough, designers also should consider whether their plans for installing that equipment meet the right seismic standards.

Support and isolation are the key goals of the IBC's installation requirements, to ensure ground and building movement don't end up dislodging the generators or disconnecting them from their fuel lines and wiring systems. Incorporating flexible connections into the design is critical in protecting the equipment from this kind of damage. But engineers need to be aware of several other installation requirements, as well.

To begin, how generating systems and their ancillary components are anchored is a primary factor in successful seismic design. Anchors and the concrete into which they are embedded must meet strict guidelines to pass IBC requirements.

Vibration isolation is another key success factor helping to ensure generator-set survivability. Creating the right foundation and incorporating the right vibration isolators are important contributors to achieving this goal.

Dynamic loading is a major consideration in this process, which can be addressed by designing a foundation that weighs at least twice—and up to 10 times—as much as the generator set. Additionally, the foundation should extend at least 12 inches beyond the skid on all sides and rise at least 1 foot above the floor, and

its base should lie below the frost line, to prevent heaving. The soil bearing load at the location should be confirmed with local officials and the building's soil-analysis report to ensure it is adequate to support the combined foundation and generator set.

A generator set's engine and alternator must be isolated from its mounting structure, regardless of how this foundation is constructed. Bolting a generator set directly to a floor or foundation will result in excessive noise and vibration, and could damage the generator, the floor and other equipment. Vibrations transmitted through the building structure also could damage the structure, itself.

Seismic isolators are used to accomplish this task. While standard vibration isolators—including integral isolators built into the design of the generator set itself —help reduce generator-induced vibrations, seismic isolators are required to reduce the threat posed by building vibrations resulting from a seismic event. These are restrained devices which ensure that the equipment remains anchored and doesn't break free of the structure to which it is attached. They often are installed between the skid base and the structure and are available in both synthetic rubber and steel-spring fabrications.

Seismically rated vibration isolators are not "one size fits all." Depending on the ground accelerations in a particular location and where the equipment is located in a building, the design (and consequently cost) of a seismic vibration isolator can vary tremendously. The IBC provides calculations to help engineers determine which strength isolator is required for a given project. These calculations take a number of factors into account, including the:

- Horizontal g-level the equipment needs to withstand;
- Equipment's weight and center of gravity;
- Location in a building where equipment is installed;
- Spectral response coefficients.

In addition, because the IBC uses site-specific data rather than regional information to determine seismic hazards, these calculations require inputs based on local conditions. These seismic design values, including probabilistic hazard curves and uniform hazard-response spectra, can be found using an application available from the U.S. Geological Survey's website, at: *http://earthquake.usgs.gov/research/hazmaps/design/index.php*. Entering either the site location's ZIP Code or latitude and longitude will provide the figures necessary to complete the calculations.

Finally, the installation's location within the building also must be factored into these calculations. For example, seismic forces will have greater impact on rooftops than on ground-level or below-grade sites. As a result, rooftop generators may require stronger seismic isolators than those installed elsewhere in a building.

Conclusion

With the IBC now the primary U.S. building code, engineers need to be familiar with the code's strict seismic and wind provisions. In some areas, design professionals may be facing seismic-certification

requirements previous map-based standards didn't present. Now, they need to ensure the equipment they specify can meet the same seismic loads as the buildings in which that equipment is located. Understanding seismic-performance requirements, and addressing those conditions in specifications and installation designs, has become a key component in any building's approval by local authorities. ■

Additional IBC Information

The following chapters in the IBC describe the requirements for seismic design and equipment certification:

- Chapter 16 describes the requirements for seismic-resistant design. Code requirements and methodology are based on data developed in the 1997 National Earthquake Hazards Reduction Program (NEHRP) which was funded by the Federal Emergency Management Agency (FEMA). Section 1613 states the requirement to provide a compliant system.
- Chapter 17 describes the certification, testing and inspection requirements. It also covers requirements for special inspections, quality assurance plans, etc. Section 1702 defines Certificate of Compliance and Section 1703 states the requirements and definition of approvals, including approved agency and labeling.

The following resources provide information and assistance with the IBC and seismic requirements:

- A printed version of the 2006 IBC and software CD can be ordered online at *www.iccsafe.com*
- The U.S. Geological Survey provides spectral maps on its website at *http://www.eqhazmaps.usgs.gov/*.
- The Building Seismic Safety Council of the National Institute of Building Sciences (NIBS) provides its National Earthquake Hazards Reduction Program (NEHRP) recommended provisions for seismic regulations for new buildings and other structures (FEMA 450) at *http://www.bssconline.org*.

San Antonio Plays Host to EGSA 2009 Spring Convention

The Electrical Generating Systems Association (EGSA) held its 2009 Annual Spring Convention at the San Antonio Grand Hyatt in historic San Antonio, TX, March 15-17, 2009. Conference sessions were designed to be of interest to virtually every On-Site Power Industry professional.

In "Bringing Humor into the Workplace." Darren LaCroix of The Humor Institute, Inc., detailed how the use of humor in the workplace can increase employee motivation, build stronger client relationships, and improve sales presentation skills—all factors that can increase profitability.

In "A Fresh Approach for Developing New Cogeneration Markets in a Carbon-Constrained World," Robert Farmer, President of Third Planet, Inc. noted that extensive deployment of cogeneration systems offers the greatest opportunity to reduce greenhouse gas emissions and improve energy security. But visionary applications are required together with new market development practices to realize cogeneration's full potential.

In "The Green Switch," a representative of the City of San Antonio's Office of Environmental Policy discussed how the City is reshaping and "greening" the local economy. The session highlighted the approach the City of San Antonio is currently taking as it follows its new sustainable development plan.

In his Opening Tuesday Keynote "Building Our Energy Future: Innovation for the New American Century," Andy Karsner, Assistant Secretary for the Office of Energy Efficiency and Renewable Energy, thrilled his attendees with his discussion of what current opportunities exist to address our energy and environmental challenges and why efforts to deploy technologies and infrastructure must be dramatically increased. Karsner's presentation was among the strongest of the entire program in audience reaction and included highlights on how commercializing and financing energy technology and infrastructure will dominate global energy conservation in the future along with what we can expect from a new era of American leadership with regards to emissions reductions and domestic clean energy sources.

Finally, in "The Future of Renewable Energy in Power Generation," John D. White, Chairman of the Board and CEO of Standard Renewable Energy Group, LLC (SREG) discussed his view of the political future of renewable energy in power generation based on his experience with President Barack Obama's energy policy and his focus on renewables.

A slide show of convention photos is available online at *www.EGSA.org*. Copies of convention session handouts also are available to members only.

EGSA Manufacturers Showcase

In addition to the lineup of educational sessions, the conference included EGSA's highly successful Manufacturers Showcase. The exhibition setting allows for a more formal dialogue between EGSA-member manufacturers, attending Distributor/Dealers and manufacturer representatives. Raffles for $100 in cash were held throughout each session of the Showcase. Raffle winners included: Robert Yongue, JRS Custom Fabrication, Inc.; Jerry Steinberg, Industrial Power Systems, Inc.; Steve Huber, R.L. Kistler, Inc.; Vaughn Beasley, Ring Power Corporation; Peter Collins, CVT Corp.; John Garcia, Doosan Infracore Portable Power; Steven Roix, GTI Altronic, Inc.; Daniel Girard, CVT. Corp.; Andy Ebert, R.W. Chapman Co. Inc.; and Kenneth Jones, EPAC Sales & Service Co. Inc.

Jerry Steinberg of Industrial Power Systems, Inc. (right) received $100 in cash from EGSA President Greg Linton, thanks to the Manufacturers Showcase Raffle.

The EGSA 2009 Fall Technical & Marketing Conference will be held September 13-15 in Colorado Springs, CO. Registration information will be available in the coming weeks. ■

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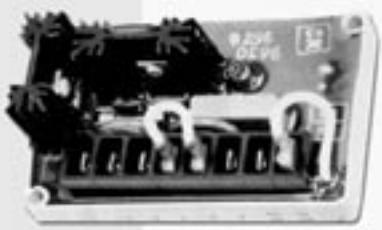

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Cogeneration and Climate Change

By Robert Farmer, President of Third Planet, Inc.

From a carbon dioxide emissions perspective, the current economic opportunity and business challenge facing the U.S. On-Site Power industry is to develop near-term markets for highly efficient cogeneration.

There is great urgency attached to this challenge. The largest source of carbon dioxide (CO_2) emissions in the U.S.–greater than all transportation emissions combined –is baseload coal power generation.

The numbers tell the story: The EPA's *2009 U.S. Greenhouse Gas Inventory Report* reveals that fully 82% of all CO_2 emissions in the electricity sector come from baseload coal plants. These in turn account for 32% of all CO_2 emissions from all sources and are 5% greater than all the CO_2 emissions from the transportation sector alone. In the global context, emissions from U.S. coal plants are 6.6% of the world's total CO_2 emissions from all sources, and they are growing. Since 1990, CO_2 emissions from U.S. baseload coal plants have increased by 28.5%.

Thanks to the fuel's CO_2 emissions and the struggling economy, coal finds itself in uneasy hiatus while long-term (25+ years) research and development continues in the quest to find geological and technical solutions to carbon capture and storage (CCS). At some point in the near future the economy, population, and housing starts will begin to recover. When they do, new baseload power will eventually be required and pressures will mount to build new coal-based central power plants with their incumbent emissions.

Given the unlikely possibility of delivering near-term renewable baseload at scale, I propose that the electrical generating systems industry must counter new coal developments with natural gas and gasified biomass-powered cogeneration in district heating and cooling applications. The reasons are simple enough.

Cogeneration is highly efficient and cleaner than any other fossil-fuel based technology. It is eminently viable in the near-term (5-25 years) as a low-carbon solution for baseload, especially when integrated with renewable energy resources in district energy systems. And absent long-term (25+ years) carbon capture and storage and advanced nuclear power, it can have an immediate impact on CO_2 emissions reductions. Equally important, cogeneration is the key enabling technology for the transition to sustainable gasified biomass – the ideal renewable fuel of combined heat and power generation.

Federal and state rulemakers are already working to reduce power plant and other carbon emissions, thus leading to the active role cogeneration must play in our energy security and climate change future. Now the On-Site Power Generating Industry needs to lend its vision, leadership and voice in an effort to champion cogeneration, to promote big picture visionary district energy applications, and to partner in the development of the domestic and international markets for these applications.

> Fully 82% of all CO_2 emissions in the electricity sector come from baseload coal plants.

Meanwhile, global climate change waits for no-one.

The Enhanced Greenhouse Effect

Beyond the science and international negotiations, the anecdotal evidence of global climate change appears irrefutable. Looking at snow and ice data alone, 30 years ago Mounts Fuji and Kilimanjaro were covered in snow year round, glaciers were intact and slow-moving, and polar ice was permanent. Not anymore.

What has caused the climate to change? In 1860 the Irish physicist John Tyndall demonstrated and measured the absorption of infra-red radiation by CO_2 and water vapor. In 1896 the Swedish chemist and Nobel laureate Svante Arrhenius took the work a step further. He pointed out that CO_2 in the atmosphere served as a "heat trap" because it allowed high-frequency sunlight to penetrate freely to the Earth's surface but was opaque to the low-frequency infra-red radiation that the Earth re-radiated at night. His CO_2 model also included what later became known as a "feedback loop": the effect of increasing temperature on water vapor, which, in turn, would increase atmospheric absorption. Arrhenius suggested that even a slight rise in CO_2 levels would raise the Earth's temperature markedly.

Measurements of atmospheric CO_2 began in 1956 at the Mauna Loa Observatory in Hawaii, situated 11,000 feet high and far away from any man-made sources of pollution. In 1956 the mean CO_2 concentration was found to be 315 parts per million (PPM), 12% above the pre-industrial (1750s) level of 280 PPM recently determined from ice-core records. In 2008 the concentration was 387 PPM, a 23% increase in the last 50 years alone. CO_2 emissions are now accumulating approximately 2 PPM annually.

You may think that "parts per million" doesn't sound onerous until you discover that Chlorofluorocarbon compounds (CFCs), the principal cause of ozone depletion, are measured in parts per trillion!

This continual build up of greenhouse gases in the atmosphere is known as the "enhanced greenhouse effect." Accepting that natural variability and solar cycles may have some cyclical effect on the melting of the planet's ice and mountain snow caps it is nonetheless accepted that the enhanced greenhouse effect, in addition to any natural variability, is the real culprit in the global climate change problem.

While current scientific work and international negotiations leading up to the Copenhagen climate talks in December are based on measures to limit CO_2 equivalent stabilization to 450 PPM, the global mean temperature is still expected to increase a dangerous 2°C. Barring serious change we will reach 450 PPM long before long-term carbon capture and storage (CCS) research and development yields solutions at scale, or advanced nuclear reactors can be built.

Yet we ***must*** slow and eventually reverse the accumulation of greenhouse gas in the atmosphere. Baseload carbon emissions must be reduced immediately. There is no time to wait for long-term nuclear and carbon capture and storage for coal.

Cogeneration is a core technology for this effort, and it is a major growth oppor-

tunity for the electrical generating systems industry.

Cogeneration is the highly efficient simultaneous production of electricity, heating and cooling services from the same power source.

Known today as combined heat and power (CHP), it is a decades-old approach to power engineering used most recently in industrial and campus applications, where both electricity and large amounts of supplementary heat are required for their operations. The generation of electricity, combined with the simultaneous recovery of heat from engine cooling systems and exhausts to produce hot air and/or hot water, offers very high fuel efficiency and reduces overall production and operating costs. In turn, fuel savings from cogeneration present key competitive advantages to manufacturers and effective budget management for educational institutions.

In the last decade CHP has been increasingly viewed as a core technology for fighting global climate change and for meeting Federal Clean Air Act requirements.

Engines emit CO_2 in direct proportion to the type and quantity of fuel they use, and because less fuel is combusted in a cogeneration system, greenhouse gas emissions, such as CO_2 and criteria air pollutants like NO_x and SO_2 can be reduced by the maximum possible. Energy efficiency is therefore a key not only in competitive and energy security considerations, but also in any strategy to reduce baseload greenhouse gas emissions.

Cogeneration power plants are attractive because they are often applied at thermal efficiencies as high as 85% with few line losses due to their close proximity to the loads they serve. The fleet national average for central coal plants is 26% on a BTU-to-BTU basis after transmission losses and 50% for combined cycle natural gas turbines. But when comparing the carbon content of coal to natural gas, the primary fuel of cogeneration, the advantage swings more markedly in favor of cogeneration. EPA CO_2 emission factors are 207 lbs/million BTU for coal and 117 lbs/million BTU for natural gas. Natural gas is 43% cleaner than coal.

Many more natural gas and gasified biomass-fired cogeneration applications are needed for baseload carbon emissions reductions. The opportunities are many.

An American Opportunity

When a CHP system is further integrated with absorption chillers, a commercial technology from the 1970s, it produces chilled water from engine heat sources in addition to providing heat services. Air conditioning and chilling is required throughout much of the United States and offers an unprecedented opportunity to greatly expand CHP applications. These systems are known as trigeneration applications or simply as combined cooling, heat, and power (CCHP).

District heating and cooling (DHC) is the conduit for new cogeneration applications. Denmark elevated cogeneration applications to a whole new level as part of its response to the 1973-74 oil crisis. At the time, Denmark already had over 60 years of experience with district heating, where by-product steam and hot water are distributed to homes, businesses, and other buildings through local heating networks.

Starting with the Danish Energy Policy 1976, Denmark passed a series of far-reaching national energy policies that provided local governments with incentives to develop local district heating systems as core components of Denmark's national energy strategy. That work continues to grow and evolve. Today, cogeneration systems are not only connected to stand-alone heat loads but also to local heating transmission and distribution networks to provide heat services "on demand." These have become the centerpiece of Denmark's journey toward energy independence. By 2004, 60% of the total heated floor space in Denmark was serviced by district heating networks.

There is a lot of interest in the United States for these kinds of applications and systems are now operating but the momentum needed to make CHP-driven DHC a core power consideration across the country does not exist. The question is, "How do we make district heating and cooling work in the U.S.?"

A national energy policy might help, but there are too many state and local institutional barriers at the moment to put teeth into any federal policy. It also serves no useful purpose to review the litany of barriers other than to say that electric utilities own and operate baseload coal plants. Electric utilities are the primary target market for CHP systems.

A more practical approach is to "act lo-

cally, think globally." If real barriers to cogeneration exist at the local and state levels, begin there. However, I suggest the entire process begins by considering the bigger regional and local picture.

What are the elements of big picture planning? New baseload power plants are planned to either meet the demands of new growth or to replace older units. In new growth scenarios the plants are planned by electric utilities many years ahead of the growth itself in response to local development plans. State and local planners are the focal point for developing new district heating and cooling cogeneration applications. How we connect with them is the key.

Visionary applications are required. Denmark is a district heating and cooling and CHP pioneer. Strong leadership is now coming from the UK and Germany. Their examples show the emphasis placed on spatial planning—where the spatial relationship of the entire built environment to energy infrastructure needs is considered in each community and throughout regions.

In this energy planning approach, several interconnected cogeneration applications requiring sophisticated controls provide energy services to a common DHC network to serve a wide diversity of electricity, heating and cooling loads. Supply reliability and security can be readily appreciated in this kind of design. Heating and cooling services are dispatched based on demand, similar to the U.S. electricity grid. It is interesting to note that Denmark's transmission networks can distribute hot water at distances of up to 10 miles.

A very high premium is placed on future-proofing – the process of anticipating future development on existing DHC networks. It provides the network with the flexibility to be adapted and expanded Lego-style (Lego is a Danish company) when needed. In this way new resources such as heat transmission expansion and future biomass-powered cogeneration systems can be added as required. How might we imagine a community or region built entirely on CHP and district heating and cooling systems for energy services?

Pieces Of A Big Picture Vision

City-to-rural in scope, spatial planning integrates urban and rural energy infrastructure into one whole. Carefully planned integrated resources serve many different dedicated electric and thermal loads in addition to being able to provide backup service for the DHC network. Coordinated resources and maximum flexibility are fundamental for the control systems necessary to provide reliable, on-demand thermal and electrical services.

Rural biomass resources are processed into biogas fuels for CHP systems serving an entire region of urban and rural electric, heat, and cooling loads. Landfill, digester, and natural gas CHP power plants and such sources as deep-water cooling systems serve similar loads. But all energy sources are interconnected into a local DHC grid network.

Businesses requiring steam heat, cooling or refrigeration services are located in industrial parks built close to combined-cycle gas turbines repowered to serve these district heating and cooling applications.

> The big picture is all about how one area or neighborhood interconnects with its built environment and others.

Local government, especially those with municipal utilities, plan their urban facilities to take advantage of CHP systems to provide electricity, heating and cooling to downtown office buildings and shopping centers. Rural cultural facilities are planned to provide thermal services to rural businesses and residences.

Examples of large local government needs that can be serviced by CHP installations while integrated with other community thermal loads include airports, hospitals, desalination plants, libraries, convention centers, recreational facilities, and office buildings spatially connected to residential, commercial, and industrial loads.

Developments also utilize micro-turbine and fuel cell-based CHP integrated with solar PV and wind resources as pieces of comprehensive, integrated, city/region-wide solutions. The big picture is all about how one area or neighborhood interconnects with its built environment and others. The possibilities are endless.

Education as Business Development

The tools exist to execute this level of energy planning. State and local government must be willing to seek the best solutions and have the will to implement them. And it all begins with education.

We should also look to Europe for best practices. There is no cookie-cutter approach; what works for them may not work for us but they can guide us and assist us if required. The value lies in the practical experience.

Non-professionals can have difficulty grasping the concept of cogeneration. Many essential collaborators don't know how CHP works and how the applications may work for them. The possibilities may be endless in the minds of practitioners but they are only possible in practice with an informed and willing audience.

Decision-makers must be educated. Without them, planning and projects cannot be developed. Here the educational process becomes the act of new business development. The large audience is made up of state and local policymakers; electric and gas utilities; state Public Service Commissions (PSCs); energy and climate commissions; state and local government including economic development and planning agencies, large consumers of heating and cooling energy services, builders, developers and others.

Many partners are needed to develop the projects. These include members of the American Planning Association (APA) and the American Institute of Architects (AIA), engineers, state and regional departments of environmental protection, the banking and insurance communities and citizen groups. The group process is best facilitated by creating partnership forums to create community conversation. The key is to get the community and partnership conversations going.

Many points of entry exist to initiate the education and market development process. For example, Florida statutory law grants utilities franchises to sell electricity. There is no similar provision for heating and cooling services. This could open the possibility for local government and large commercial entities to partner with utilities to deliver heating and cooling services. In another example, electricity production competes with residential heating and commercial uses for natural gas supplies. We can show local government and developers that some of these competing demands for natural gas can be obviated by cogenerating electricity and heating with less fuel consumption and fewer carbon emissions. These local issue examples and 'opening' recommendations can be brought before

Public Service Commissions, utilities, and local government to begin the conversation on combined heat and power.

The education and business development process can be aided by existing financial incentives. The economic stimulus package and existing policies provide incentives for district heating and cooling and cogeneration. A regulatory regime to control greenhouse gas emissions is also emerging to draw further attention and incentives toward the development of these strategically important assets.

U.S. Economic Stimulus

H.R.1, the American Recovery and Reinvestment Act of 2009 (ARRA) contains $3.2 billion for Energy Efficiency and Conservation Block Grants to state and local governments. The Department of Energy`s National Energy Technology Laboratory has specifically stated that eligible activities include district heating and cooling systems, combined heat and power systems, cogeneration systems, and absorption chillers, among others.

$3.1 billion is also available as additional funds for the State Energy Program. Twelve states currently have Energy Portfolio Standards that include CHP systems. Interestingly, ARRA contains language that would seem to assist these states in particular as funds will be made available "only if the governor of the recipient State notifies the Secretary of Energy in writing that the governor has obtained necessary assurances" that: 1) the state's Public Utility Commission will seek to initiate rulemaking proceedings related to energy efficiency incentives and utility ratemaking issues; 2) certain building codes will be met; and 3) the state will "prioritize the grants toward funding energy efficiency and renewable energy."

Federal energy policy has been in place since before ARRA to encourage district heating and cooling systems development. In one example, IRS Code allows tax-exempt bonds for DHC networks – but not for power plants themselves. This will change but gives a clear upfront indication of the importance that the federal government places on the development of DHC systems.

The Emerging Greenhouse Regime

Attempts are underway to regulate carbon emissions from coal plants in response to the threat of global climate change.

Europe's Emissions Trading Scheme (EU-ETS) and the Northeastern U.S. Regional Greenhouse Gas Initiative (RGGI) foreshadow the Obama Administration's goal of establishing a national carbon cap-and-trade system. Despite the best of intentions, the road ahead is very difficult; I find it unlikely that such a program could soon be presented in the U.S. Senate.

However, the U.S. Supreme Court has ruled that CO_2 is a pollutant to be regulated under the Clean Air Act. This has presented the U.S. Environmental Protection Agency (EPA) with a mandate to take a regulatory approach to reducing CO_2 emissions. In anticipation of EPA rules and oversight, several states have already initiated rulemaking to reduce carbon dioxide emissions from coal-fired power plants.

Indications are that CO_2 emissions rulemaking will be founded on output-based regulations. In this approach, power plant output is regulated based on the pounds (lbs) of carbon emitted per mega-watt hour (mWh) of production. In this context only the electric output of CHP systems is currently considered. The EPA and states agencies are moving quickly to set output-based regulations that include thermal output to take full advantage of the environmental benefits of cogeneration.

Indications are that CO_2 emissions rulemaking will be founded on output-based regulations.

Federal and state efforts to create Renewable Portfolio Standards (RPS) have an even greater, positive effect on CHP development. CHP systems fueled with a qualifying renewable resource, such as biomass, are eligible under RPS. Typically only the electric output of a CHP system is eligible, but states can also include the thermal output of these systems in their RPS to fully value the benefits of CHP.

As noted earlier, 12 states currently have EPS (Energy Portfolio Standard) programs (defined as RPS and/or Energy Efficiency Portfolio Standard-EEPS) in place while more EPS programs are unfolding across the U.S. Of these 12 states, seven include clean fossil-fueled CHP, five include waste heat CHP, and one includes renewably fueled CHP.

Cogeneration's future looks very bright. In a further testimonial, the Energy Information Administration (EIA) notes that in a 20% RPS scenario, biomass gasification for CHP is seen as growing substantially over solid biomass used in coal co-firing applications.

Utilities

Whether through cap-and-trade, RPS or regulatory schemes, these all will have a profound effect on the way utilities generate their revenues. In order to produce energy services with the minimum carbon footprint, they will have to sell both electric and thermal energy services, produced from the same amount of fuel, to maximize their profits. This scenario is currently unfolding. California's Air Resources Board (CARB) is modeling small-scale CHP into their CO_2 control plans with the agreement and cooperation of electric utilities.

These effects on utility planning and operations will induce local governments to integrate the CO_2 reduction measures into their own greenhouse gas reduction plans.

Local Government

In many states, initiatives are underway to hold cities and counties accountable for their carbon emissions. Organizations such as the U.S. Conference of Mayors with the assistance of ICLEI (Local Governments for Sustainability) are creating greenhouse gas management plans beginning first with an inventory and then developing action plans. In parallel, local and state rulemakers are placing greater emphasis on the role that local and regional jurisdictions must play.

In the U.S., state governments use local comprehensive development plans to direct urban planning. In Florida for example, development may not proceed without state approval of local comprehensive development plans. Florida law requires the plans to address, among other things, electric power plants and transmission as well as greenhouse gas reduction strategies.

This convergence of legislation, regulation, voluntary initiatives, and the impact of new low-carbon power plants on regional and local development is reshaping how communities plan infrastructure. It will also promote local economic development and higher education research on energy infrastructure, make their cities more attractive to newcomers, and increase the community's tax base.

Public Service Commissions

Strategic electricity and natural gas planning is the purview of state regulators and the utilities. Local government now joins that exclusive group and brings with it the demand for new thermal energy services. State public service commissions must be empowered to regulate these thermal energy services to the benefit of the consumer. In addition to hot water and cooling services, their mandate will include energy efficiency portfolio standards; biomass requirements for renewable portfolio standards; ratepayer investments in local economic development; and local gasified biomass production among others.

Action Plan

Significant profit-making opportunities exist for the On-Site Power industry in developing near-term markets for district heating and cooling and cogeneration applications. But the industry must rise to the challenge with urgency. Applications are needed today to replace coal power plants—the leading source of carbon dioxide emissions produced by the U.S. electric power sector.

The work begins by educating policymakers, local government, electric utilities and Public Service Commissions. However care must be taken in crafting the message, because cogeneration concepts may be difficult for lay audiences to understand.

While this article covers many aspects of the process, there are a few points upon which to focus:

- Educating your market *is* business development.
- Start in communities where coal plants are either being postponed or proposed.
- Your initial target audience for education should be the Public Service Commissions, electric utilities and local governments and planners.
- Think big picture instead of individual applications.
- Do everything in your power to help enact a national natural gas energy strategy that ensures the fuel's viability for the near-to-long term.
- Make your own community sustainable.

About the Author

Robert Farmer is a production planning engineer and president of Third Planet (*president@thethirdplanet.org*), a 501(c)(3) nonprofit operating foundation based in St. Augustine, FL. He was a featured speaker at the 2009 EGSA Annual Spring Convention in San Antonio, TX. ■

Application for Membership

ELECTRICAL GENERATING SYSTEMS ASSOCIATION

1650 South Dixie Highway, Suite 400, Boca Raton, FL 33432 • 561-750-5575 • FAX 561-395-8557
E-Mail: *e-mail@EGSA.org* • World Wide Web: *www.EGSA.org*

Under the leadership of its Board of Directors and operating through its various committees and staff, EGSA strives to educate, provide networking opportunities and share relevant knowledge and trends with industry professionals including manufacturers, distributor/dealers, engineers, manufacturer representatives, contractor/integrators and others serving On-Site Power consumers.

1. Contact Information

Please type or print all information in upper and lower case (NOT ALL CAPS!)

Company _

Address __

City _____ State/Province _____

Zip/Postal Code _____ Country _____

Phone _____ FAX _____

Official Representative _____ Title _____

Representative's E-Mail _____ Company's Web Address _____

How did you hear about EGSA? ❑ Web site ❑ *Powerline* magazine ❑ Colleague ❑ POWER-GEN ❑ Other _____

Why are you joining EGSA? ❑ Certification Program ❑ CEU Program ❑ Power Schools ❑ Buying Guide Listing ❑ Other _____

2. Member Classification

Read the Membership classifications below and check the box that describes your firm's classification.

I. FULL MEMBERSHIP

❑ MF **Manufacturer Membership**
Any individual, sole proprietor, partnership or corporation seeking membership must apply for a Full Membership as a manufacturer if they meet one or more of the following criteria:
1. They manufacture prime movers for power generation.
2. They manufacture generators or other power conversion devices producing electricity.
3. They manufacture switchgear or electrical control devices.
4. They manufacture or assemble generator sets, UPS systems, solar power, hydropower, geothermal, or any other power production or conversion system including related components or accessories for national or regional distribution.
5. They are a wholly owned subsidiary of a firm that qualifies under rules one through four.

❑ DD **Distributor/Dealer Membership**
Any individual, sole proprietor, partnership or corporation actively engaged as a distributor or dealer for products listed under Manufacturer Membership may apply for Full Membership as a Distributor/Dealer. If an organization qualifies under Manufacturer Membership, it is not qualified under this section.

❑ CI **Contractor/Integrator Membership**
Any individual, sole proprietor, partnership or corporation actively engaged as a Contractor or Equipment Integrator of products listed under Manufacturer Membership, not bound by brand, geographic territory or contractually obligated as a Distributor/Dealer of a specific product. These firms typically purchase products from a Distributor/Dealer, Manufacturer or Retailer, adding value through installation, product knowledge, relationships, unique services, etc., and then re-sell the resulting product to an end-user.

❑ MR **Manufacturer's Representative Membership**
Any individual, sole proprietor, partnership or corporation actively engaged in the representation of products listed under Manufacturer Membership may apply for Full Membership as a Manufacturer's Representative. If an organization qualifies under Manufacturer Membership, it is not qualified under this section.

❑ EM **Energy Management Company Membership**
Any individual, sole proprietor, partnership or corporation engaged in energy management, including Energy Service Companies (ESCOs), Independent Power Producers (IPPs), Integrators, Aggregators, and other similar enterprises may apply for Full Membership as an Energy Management Company.

❑ **Associate Full Membership** *(mark appropriate category at right)*
Any individual, sole proprietor, academic institution, student, partnership or corporation meeting the requirements of Associate Regular Membership may apply for Full Membership at their option to enjoy the privileges of Full Membership, including the rights to vote and to serve on EGSA's Board of Directors. Initiation fees and annual dues will be assessed at the existing non-manufacturer Full Member rates.

II. ASSOCIATE REGULAR MEMBERSHIP

❑ AA **Trade Publication Membership**
Any trade publication dealing with the electrical generating systems industry or its suppliers may apply for Associate Membership–Trade Publications.

❑ AB **Trade Association Membership**
Any trade association made up of individual or company members sharing a common interest in the electrical generating systems industry may apply for Associate Membership–Allied Associations.

❑ AC **Engineer Membership**
Any consulting or specifying engineer may apply for Associate Membership–Engineer. Membership may either be held in the employer's name or individual's name under this classification. Individuals whose employer qualify as a Full Member, as described in the Full Membership section, do not qualify for this category.

❑ AD **End-User Membership**
Any individual employee of a company who owns or operates electrical generating equipment and/or related switchgear or components, whose responsibility to his employer includes planning, design, installation, supervision, or service of such equipment may apply for Associate Membership–User. Membership may either be held in the employer's name or individual's name under this classification. Individuals whose employer qualify as a Full Member, as described in the Full Membership section, do not qualify for this category.

❑ AE **Service Membership**
Any individual, organization or academic institution that offers services such as research, testing or repair to the electrical generating systems industry may apply for Associate Membership–Services. Membership may either be held in the individual's name or the organization's name under this classification. Individual companies whose employer or parent organization qualifies as a Full Member, as described in the Full Membership section, do not qualify for this category.

❑ AG **Educational Institution Membership**
Any postsecondary vocational-technical school or college offering on-site power generation-related instruction may apply for Associate Membership–Education Institution.

❑ AR **Retiree Membership**
Any individual who retires from a member company may apply for Associate Membership–Retired. This classification does not apply to any individual who is employed more than 20 hours per week.

❑ AF **Student Membership**
Any individual currently enrolled at an academic institution may apply for Associate Membership–Student.

Dues Schedule (Use for Section 3)

	Annual Dues	Initiation Fee	TOTAL
Manufacturer	$825	$200	$1025
Distributor/Dealer	$285	$100	$385
Contractor/Integrator	$285	$100	$385
Manufacturer's Representative	$285	$100	$385
Full Associate Member	$285	$100	$385
Energy Management Company	$200	$100	$300
Regular Associate Member	$200	$100	$300
Retiree Member	*Complimentary*	$0	$0
Student Member	*Complimentary*	$0	$0

NOTE: A FULL 12-MONTH DUES PAYMENT MUST BE RECEIVED WITH THIS APPLICATION. The Association's Membership Year is January 1 through December 31. Dues payments that extend beyond the first Membership Year will be applied to the second year's dues.

FULL PAYMENT MUST BE RECEIVED WITH APPLICATION.

3. Membership Dues (Please fill in the appropriate TOTAL amount from the above dues schedule.)

Membership Dues $_____

Membership Plaque (optional)** $_____39.95**

On-Site Power Reference Book (optional)** $_____125.00**

Florida Residents: Add 6.5% Sales Tax to ** items $_____

*Continental US Residents add $5 shipping/handing to**items.* $_____
Non Continental US Residents should call EGSA
*Headquarters for shipping charges for **items.* **TOTAL** $_____

4. Payment Method (Payable in US$ drawn on U.S. bank, U.S. Money Order, or American Express)

❑ Check #_____ Amount Due $ _____

❑ Money Order

❑ Mastercard ❑ Visa ❑ American Express

Card # _____ Exp. Date _____

Signature: _____

Print Name: _____

5. Products/Services

Please describe the nature of your business (50 words or less, NOT ALL CAPS). If you are a Manufacturer's Representative or Distributor/Dealer, please indicate which manufacturers you represent and/or distribute for; if you are a student, please provide the name and location of your school, your major and your anticipated graduation date:

_____

_____

_____

_____

_____

_____

Do you buy AND sell equipment? ❑ Yes ❑ No Do you manufacture packaged equipment? ❑ Yes ❑ No

Available Codes:

01 ---Batteries/Battery Chargers
02 ---Control/Annunciator Systems
29 ---Education
30 ---Emission Control Equipment
04 ---Enclosures, Generator Set
05 ---Engines, Diesel or Gas
06 ---Engines, Gas Turbine
07 ---Engine Starters/Starting Aids
08 ---Filters, Lube Oil, Fuel or Air
28 ---Fuel Cells
03 ---Fuel Tanks and Fuel Storage Systems
09 ---Generator Laminations
10 ---Generator Sets
11 ---Generators/Alternators
12 ---Governors
13 ---Heat Recovery Systems
14 ---Instruments and controls, including meters, gauges, relays, contactors, or switches
15 ---Load Banks
16 ---Motor Generator Sets
17 ---Radiator/Heat Exchangers
18 ---Relays, Protective or Synchronizing
19 ---Silencers/Exhaust Systems/Noise Abatement
20 ---Solenoids
21 ---Swtichgear and Transfer Switches (Automatic or Manual), Bypass Isolation Switches, and/or Switchgear Panels
22 ---Trailers, Generator Set
23 ---Transformers
24 ---Uninterruptible Power Supplies
25 ---Vibration Isolators
26 ---Voltage Regulators
27 ---Wiring Devices or Receptacles

Enter codes here:

Products sold: _____

_____

Products rented: _____

_____

Products serviced: _____

_____

6. Sponsor(s):

A"Sponsor" is an EGSA Member who interested you in filling out this application. It is not mandatory that you have a sponsor for the Board to act favorably on this application; however, if a Member recommended that you consider membership, we request that individual's name and company name for our records.

Sponsor Name _____Company Name _____

7. Official Representative's Authorization

Signature _____Date _____

Jerry Steinberg Announces Retirement from IPS

Industrial Power Systems, Inc. has announced the retirement of Jerry Steinberg, after almost 16 years with the company as Vice President-Sales & Marketing.

Steinberg graduated from the University of Illinois in 1961, and immediately after graduation joined Cummins Engine Co, where he had several domestic positions in Columbus, IN before moving into their International Sales organization with time living in both London, England and Sao Paulo, Brazil.

Steinberg then worked a number of years for Waukesha Engine, ending as their VP-Sales & Marketing. He then spent a number of years in the Distribution business, working with both Power Equipment Inc. in Ohio and Reagan Equipment Co. in Florida. He had his own Export Sales Company, Global Marketing Services for almost 4 years, before joining IPS in December, 1993 and he ends his career there this year.

From left: Darlene Kidwell, Arthur Coren, Cindy Steinberg, Jerry Steinberg and Judy Coren pose for a snapshot at the EGSA 2009 Spring Convention Awards Reception.

Jerry, along with his wife Cindy, will continue to reside in Jacksonville, FL., although they have a good many trips planned in the near-term future. They invite all their long time friends and business associates to keep in touch, and stop and visit whenever they travel through the Jacksonville area.

MTU Onsite Energy to Supply Gensets to APR Energy

MTU Onsite Energy has announced it will supply 40 diesel-engine powered generator sets to APR Energy in Jacksonville, FL for Peruvian Energy Authority project in northern Peru.

The gensets will be used by APR Energy to deliver supplementary power to the Peruvian Energy Authority for the utility grid in Trujillo Province in northern Peru. As one of the largest cities in Peru, Trujillo's power needs have increased significantly in recent years, resulting in an increase in demand on the power grid.

Wärtsilä Expands Netherlands Service Center Capacity

Wärtsilä has announced it has expanded its services capacity in the Netherlands with new, larger premises and a modern training center. The new Wärtsilä Land & Sea Academy training center at Waalwijk

Continued on next page

EGSA Presents Arthur and Judy Coren With a Portrait of David Coren in Celebration of the David I. Coren Memorial Scholarship Program's Success

Former EGSA President Arthur Coren (1978) and his wife Judy were recently presented with a portrait of their late son David Coren in celebration of EGSA's increasingly successful David I. Coren Memorial Scholarship Program. The presentation was made by former EGSA President Gary Kidwell (2001, 2007) during the 2009 Annual Spring Convention Awards Banquet. Since many in the audience had not had the privilege of meeting David, Arthur was asked to share a little about his son, and how he impacted the Association. The Association would like to share Arthur's comments, recapped below, with all members and the readers of *Powerline* magazine.

David received his Bachelor Degree from the University of Illinois, while earning his CPA license. He joined Arthur Anderson and earned his MBA from Northwestern University. David then worked at another big eight accounting firm, Coopers and Lybrand before working with Deerpath Partners, who purchased and operated a stable of companies. After David had been out of school for about nine years, I convinced him to come to work for my company, Zenith Controls. David was active in Zenith's business development group, strategic planning and marketing, and he worked closely with Executive Vice-President Ron Seftick. With time, David became President of Zenith Controls. He never approached his work at Zenith with a sense of entitlement—only a desire to work with everyone to concentrate on the growth and success of the company. He tackled all challenges in a logical manner, never trying to impress people with who he was but with the quality of his ideas.

At the same time David joined Zenith Controls, he also became active in EGSA. He gave a few presentations on finance and accounting, joined the Convention Planning Committee and eventually assumed the role of Chairman of that committee. At EGSA he approached his responsibilities with a strong desire to have his committee succeed in building the best convention programs. David truly enjoyed being part of EGSA, and he treasured the friendships that he made with Association members.

David had the potential to lead – not just with Zenith, but with EGSA, too. Sadly, in April of 1999, he was diagnosed with a brain tumor, and in September of 2000 we lost him. We lost so much: his amazing potential; his respect for all those with whom he worked; the brilliance of his ideas; and the special regard he had for all in our industry. We miss him so much, and we miss the success he surely would have had. And yet we still celebrate his character, integrity, his life and his accomplishments.

Former EGSA President Gary Kidwell (left) poses for a photo with former EGSA President Arthur Coren (far right) and his wife Judy Coren. The Corens received a portrait of their son, David, for whom the David I. Coren Memorial Scholarship program is named.

David is remembered in so many ways: by EGSA with the David I. Coren Memorial Scholarship Fund; by the American Brain Tumor Association (ABTA) where he has a fund to support research; he is survived by his family and friends, his parents, his wife and his two children. The David I. Coren Memorial Scholarship is particularly meaningful, since it helps those wanting to contribute and work in the on-site power field.

The establishment of this fund has given EGSA another entrée to schools that offer on-site power-related curriculum. More importantly, EGSA has now provided scholarships to over 60 students and has enabled them to pursue a career that is meaningful to our industry, our economy and our country.

Continued from previous page

in the Netherlands allows Wärtsilä to offer a broad package of technical training programs to its customers, employees and educational institutions. The Wärtsilä Land & Sea Academy is one of ten Wärtsilä training centers worldwide. For more information visit *www.wartsila.com*.

EPA to Reduce Stationary Diesel, Gas-Fired Engine "Air Toxics"

On February 25, 2009, the Environmental Protection Agency (EPA) proposed national emission standards for hazardous air pollutants (NESHAP) for stationary reciprocating internal combustion engines (RICE) that are not already covered by earlier EPA regulations. This rule would set emissions limits for engines that: are located at area sources of air toxics emissions; have a site rating of less than or equal to 500 horsepower, are located at major sources of air toxics emissions, and were constructed or reconstructed before June 12, 2006; and/or have a site rating of greater than 500 horsepower, are located at major sources of air toxics emissions, and were constructed or reconstructed before December 19, 2002.

These engines are used at facilities such as power plants and chemical and manufacturing plants to generate electricity and power pumps and compressors. They are also used in emergencies to produce electricity and pump water for flood and fire control.

The rule would reduce emissions of a number of toxic air pollutants including: formaldehyde, benzene, acrolein and others. Toxic air pollutants, also called air toxics, are those compounds known or suspected to cause cancer, other serious health problems and environmental damage.

The comment period for the rule has been extended to June 2009. EGSA Members are encouraged to contact the EPA with their views on the proposed rule. For more information, visit *http://www.epa.gov/ttn/caaa/t3/fact_sheets/rice_neshap_prop_fs_022509.pdf* ■

EGSA Job Bank

POWER GENERATION TECHNICIANS

Cummins NPower, the area's exclusive engine & power generation systems distributor for Cummins and Onan products is seeking qualified Field Service Power Generation Technicians to diagnose, troubleshoot, & repair electrical generator systems & related engine mechanical failures, & utility transfer switches & switchgears. Positions are available in Illinois, Wisconsin & North Dakota. To view all open positions visit our website, *www.cumminsnpower.com*. To apply, send a resumé via email to *npowerhr@cummins.com* or fax to 651-286-2111. EEO/AA

Regional Sales Manager

DEIF, a world-class global supplier of controls for power generation, is looking for a RSM to cover the central and eastern parts of US/Canada. Technical Sales experience in the distributed generation market is required. BS degree preferred; seasoned professional with over 10 years experience related to electrical power is required. Position is located Fort Collins, CO, with a future move to be closer to customers possible after the first year. For more details please see complete posting on EGSA website or contact *us@deif.com*.

Generation Sales

Central Power Systems & Services, Inc. – Two (2) Generator Sales positions covering Central Kansas. We offer a strong base wage, incentive program and a full benefit package (including FREE MEDICAL insurance, FREE LIFE insurance, paid vacation, profit sharing and 401(k), etc.). Fax a cover letter, salary requirements and your resume to 816-781-4518 or e-mail it to *jobs@cpower.com* EOE

Generator Service Technicians

Kinsley Power Systems is hiring Generator Service Technicians in various areas in the Northeast. The ideal candidates possess experience to perform service work on 8.5kW – 2,500kW generators. Experience working on industry generators is preferred. Candidates w/strong engine experience will be considered too. Resumes to: *shobbs@kinsleypower.com*

Generator Field Technician

A fast growing Utah based standby power company has an opening for a full-time field technician to perform routine generator and transfer switch preventative maintenance, troubleshooting, repair work, and startups. Prior field experience in the generator standby power industry is required. Must have a good driving record, be clean cut, and be drug free. Competitive wage, benefits, company cell, and company truck are available for a qualified individual. Please fax resume to 801-544-7010.

Generation Technicians

Due to our continued growth, Central Power Systems & Services, Inc. has immediate openings for Generator Technicians at several of our Missouri, Kansas and Oklahoma facilities. We offer a strong base wage and a full benefit package (including FREE MEDICAL insurance). Fax a cover letter, salary requirements and your resume to 816-781-4518 or e-mail it to *jobs@cpower.com* EOE

GENERATOR SERVICE TECHNICIANS

KELLY GENERATOR & EQUIPMENT, INC., the mid-Atlantic leader in standby electrical generators is seeking experienced Generator Technicians. We are a full service distributor of emergency standby and prime power located in the mid-Atlantic region that covers Delaware, Maryland, Northern Virginia, West Virginia and Washington, DC.

We offer SALES, SERVICE, PARTS & RENTALS

- We have an extensive Service & Parts Department to back up your work.
- We offer factory training on the lines we represent as well as "in house" training.
- We offer medical, dental, vision, 401(k), profit sharing, short and long term disability, paid holidays, annual leave, overtime and paid "On Call."

Must have a High School Diploma (Vo-tech or GED), 3 – 5 years experience servicing industrial generator sets and associated equipment. Must be able to service, repair and troubleshoot the engine, as well as the alternator end and controls of the equipment. MILITARY A PLUS! Visit us on our website at *www.kge.com*. Fax RESUMES to 410-257-5227 or e-mail to *dkelly@kge.com*.

Power Systems Sales

Pacific Power Products has an opening for a salesperson in our Seattle WA territory. Person must be predisposed to outside sales. The position has support from dedicated project managers, sales coordination and admin. Person should have working knowledge of power generation equipment but all candidates with applicable skills will be considered. We are the distributor for MTU-Onsite Energy and Waukesha. Compensation includes base, car allowance, health insurance and 401K. Forward resumes to *relder@pac-power.com*

RENTAL SALES

KELLY GENERATOR & EQUIPMENT, INC, the mid-Atlantic leader in standby electrical generators is seeking an experienced RENTAL SALES person to join our team. We are a full service distributor of emergency standby and prime power located in the mid-Atlantic region: Delaware, Maryland, Washington DC, Northern Virginia and West Virginia.

Develop strong relationships with electrical and general contractors, home builders, event companies, industrial and commercial end users and rental houses. Focus will be on the rental (and sales) of mobile generator sets as well as renting load banks.

We offer a solid base with commission, medical, dental, vision, 401(k), profit sharing and more. FAX resumes to 410-257-5227 or e-mail *dkelly@kge.com*.

Business Builder Seeks Opportunities

Looking for an experienced business builder and channel developer for your company? I have years of experience in sales, marketing and general management. Acute understanding of goals. Growing family / lifestyle businesses a specialty. If you want to get to the next level, contact me. permanent or short term. Nationwide. Please respond to J.Kellough@EGSA.org, (Reference PLMJ09JB-1).

Generator Service Technician

Johnson & Towers, Inc. A leader in the power systems industry is currently accepting applications for an experienced Generator Field Service Technician. Immediate opening for an experienced Generator Technician. Capable of maintenance, repairs and troubleshooting to diesel and gaseous generators for a variety of commercial and government clients. Ideal candidate would possess the following: abilities to repair, troubleshooting and perform start up of generators and switchgear. Ability to work alone or in a team environment. The availability and desire to take a full-time permanent field service position. A clean driving record, background. Candidate must possess at least 3 years experience working on Generators and Switch Gear. Benefits include health, dental, life, short and long-term disability plans, along with a 401k plan. Please submit resume to *rdiem@johnsontowers.com*

Generator Field Technician

PM Technologies, LLC has several immediate openings for Generator Technicians. We are located and operate in Michigan, Ohio and Northern Indiana. High School diploma or equivalent a must. Military experience a plus. Must be able to troubleshoot and repair the engine (diesel and gaseous) as well as the generator end. Customer interaction will be required on a daily basis. We need highly motivated, self sufficient people to assist in growing our expansion efforts at new branch locations. Benefits include company vehicle, 401k, health, dental and vision coverage's as well as paid bonuses for new account procurement. Please Fax resumes to 248.374.6408 or email to *dpopp@pmtech.org*

Generator Set Sales/Service

Experienced sales/service engineer needed by southern California company to sell engine generator sets.
Please respond to *J.Kellough@EGSA.org* (Reference PLND06JB-1).

EGSA Job Bank Guidelines

EGSA will advertise (free of charge) EGSA Member company job openings in the Job Bank.

Free use of the Job Bank is strictly limited to companies advertising for positions available within their own firms. Companies who are not members of EGSA and third-party employment service firms who service our industry may utilize the Job Bank for a $300 fee.

Blind box ads using the EGSA Job Bank address are available upon request; company logos may be included for an additional fee. EGSA reserves the right to refuse any advertisement it deems inappropriate to the publication. Please send your classified ad (limited to about 50 words) to: EGSA Job Bank, 1650 S. Dixie Hwy, Suite 400, Boca Raton, FL 33432. Or, send it via e-mail it to: *J.Kellough@EGSA.org*

New EGSA Members

MF=Manufacturer DD=Distributor/Dealer CI=Contractor/Integrator MR=Manufacturers Rep EM=Energy Management Co.
AA=Trade Publication AB=Trade Association AC=Engineer AD=End-User AE=Service AG=Educational Institution AR=Retiree AF=Student

Advanced Generator . . . . . .(DD)
Naperville, IL
(630) 820-0920 Fax: (630) 820-1103
Contact: Larry Landrum, Owner
Business: Generac, GAC, Dyka.

Barry Vance . . . . . .(AE)
Dickinson, TX
(281) 337-5240
Business: Diesel power generator mechnanic, LOGCAP project, Middle East.

Battin Power, Inc.. . . . . .(DD)
Milwaukie, OR
(503) 777-3065 Fax: (503) 777-5055
Contact: Laura Battin, CEO
Business: Repair/Buy/Sell/Rent Generators.

Bio-Gas Technologies, Ltd. . . . . . .(CI)
Norwalk, OH
(419) 663-8000 Fax: (419) 663-8014
Contact: James R. Hiendlmayr, President
Business: Designer, builder & installer of landfill gas-to-energy systems, cogeneration systems and bioreactor systems.

Bojiuc, Marisa. . . . . .(AF)
Marina del Rey, CA
(310) 591-5607
Business: Communications student interested in energy matters. Anticipated graduation date is August 2010.

Cummins West, Inc. . . . . . .(DD)
San Leandro, CA
(510) 351-6101 Fax: (510) 347-6173
Contact: Barry Kreuzer, V.P.
Business: Cummins Power Generation, ATS & switchgear products and service. Cummins West also provides emission compliance products and services.

Eastern Generator Sales & Service Inc. . .(DD)
Folcroft, PA
(610) 237-1990
Contact: David Mattocks, President
Business: Sales, 24 hour service and rental of emergency power equipment including: Multiquip, Terex, Cummins, Kohler, Onan, switchgear, fuel tanks, load banks, battery chargers, etc. "Power and People you can depend on!"

Eisenmann Corporation . . . . . .(CI)
Crystal Lake, IL
(815) 455-4100 Fax: (815) 356-2978
Contact: Philip Fleck, Mgr Elec. Engineering
Business: Eisenmann Corporation is an integrator for Electratherm Systems in the biofuels industry.

ElecComm Power Services . . . . . .(DD)
Wilmington, MA
(617) 333-9520 Fax: (617) 333-9522
Contact: Brian Kerins
Business: ElecComm Power Services offers 24/7 rapid response, emergency power solutions. A wide range of rental power solutions are available from 20kW to 2 MW. We also offer permanent generator installation and maintenance. EPS can provide solutions to virtually any power problem throughout New England. Customers include Nstar Electric and Northeast Utilities.

Encorp LLC. . . . . . .(MF)
Fort Collins, CO
(703) 544-3081 Fax: (970) 674-5399
Contact: Andrew McWeeney, Regional Sales Manager
Business: Encorp designs, develops and manufactures communication, control and grid interconnection products and services for the global power quality and distributed generation markets.

Etec Enterprises. . . . . .(DD)
Tomball, TX
(281) 733-8284
Contact: James Calhoun, Owner
Business: Turn-key standby generators and UPS systems for commercial and residential. Commercial Electrical Contractor.

Fejer, Alexandre . . . . . .(AF)
Rio de Janeiro, Brazil
(5521) 9623-5508
Business: Student at Universidade Santa Ursula in Rio de Janeiro, Brazil studying Electrical Engineering and majoring in Power Market (power generators, subestations, transmission and distribution).

GEA - IHE Systems USA . . . . . .(MF)
Kenosha, WI
(717) 855-0145
Contact: David Wente, Sales Manager
Business: GEA-IHE Systems provides high quality, custom engineered heat transfer components and systems worldwide. Innovative closed loop cooling systems assure long, trouble-free lives for all electrical machines. Manufacturing facilities in Germany, Poland, China, France, Netherlands and Brazil & offices in India and the USA providing a global support network.

Genset Maintenance Company . . . . . .(AE)
Perryville, MD
(443) 206-6663
Contact: Philip H Cheek, Owner
Business: Service, maintenance, repairs of generator systems, automatic transfer switches. Work on Cat, Cummins, MTU, Kohler, ASCO and GE Zenith.

Global Cable and Electronics . . . . . .(DD)
Winder, GA
(877) 651-9473 Fax: (813) 754-8032
Contact: Robert Upshaw, President
Business: Global Cable & Electronics is a distributor of all types of wire, cable and connectors. We specialize in providing products for the power generation industry such as camlok cables and connectors. We have stocking locations throughout the U.S.

Harsen International Ltd . . . . . .(MF)
Tsuen Wan, N.T. Hong Kong
852 2405 1087 Fax: 852 2405 0287
Contact: Paul Sedman, Sales & Marketing Director
Business: Harsen International Ltd. is committed to provide the genset industry with high quality and reliable genset controllers, ATS controllers, synchronizing components, battery chargers and meters.

Hunter Defense Technologies, Inc. . . . . . .(MF)
Natural Bridge Station, VA
(540) 291-4501 Fax: (540) 291-4503
Contact: Tim Falls, VP, Engineering
Business: Hunter Defense Technologies engineers and manufactures expeditionary shelter systems, chem-bio air filtration systems, heaters, air conditioners, generators and power distribution equipment for military, homeland defense and other government applications. Our power generators generally range in size from 10kW to 100kW in stationary as well as trailer mounted configurations.

Kentech Enterprise, LLP . . . . . .(DD)
San Antonio, TX
(210) 946-2474 Fax: (210) 946-2473
Contact: Sonya Reed, Vice President
Business: Kentech Enterprise is a standby power generation company that provides full turnkey engineering and installation for stand-alone and paralleling power generation systems. In addition, Kentech provides maintenance and repair service for all types of generators. We are a distributor of MTU Onsite Energy gensets, Separ Filters, Reverso Pumps.

Leighton O'Brien Inc.. . . . . .(AE)
Colorado Springs, CO
(719) 576-9816 Fax: (719) 576-9816
Contact: Steve M. Johansen, Vice President
Business: Leighton O'Brien offers a total tank management solution for the global petroleum industry via our four services - fuel storage, tank cleaning, monitoring and testing.

Lighthouse Advisors, LLC
d.b.a. Performance Plus. . . . . . .(AE)
Southhampton, NJ
(609) 859-3500 Fax: (609) 859-3530
Contact: Lawrence A. Cardino, Pres. & CEO
Business: Performance Plus is a provider of engine and turbine driven electrical generator service and repair. Performance Plus is also a qualified supplier of value added products and installation services for the emergency power distribution market.

Maxiforce Inc. . . . . . .(MF)
Doral, FL
(800) 414-2095 Fax: (305) 592-0244
Contact: Paul F. Kelly, Sales and Mktg Dir.
Business: Aftermarket diesel engine parts, John Deere, Cummins B & C, Perkins engines.

New EGSA Members

MF=Manufacturer DD=Distributor/Dealer CI=Contractor/Integrator MR=Manufacturers Rep EM=Energy Management Co.
AA=Trade Publication AB=Trade Association AC=Engineer AD=End-User AE=Service AG=Educational Institution AR=Retiree AF=Student

Maye, John . . . . . (AF)
Tampa, FL
(813) 240-2555
Business: Student at Penn-Foster Career School, graduation date November 2009.

Motortech Americas, LLC . . . . . .(DD)
New Orleans, LA
(504) 355-4212 Fax: (504) 355-4217
Contact: Brent Powers, Vice President
Business: Motortech Americas, LLC distributes accessories as well as spare and wearing parts for nearly all kinds of stationary gas engines worldwide. Ignition control and monitoring, industrial spark plugs and high tension leads, wiring systems, gas regulation and gas engine management–from detonation to speed control and complete cogeneration management. On site support and special training courses complete our ervices.

Plan B, LLC . . . . . .(DD)
St. Thomas, VI
(340) 626-2693 Fax: (340) 776-7101
Contact: Joseph Berry, Partner
Business: Residential and commercial sales, service and repair of generators and automatic transfer switches; diesel fuel cleaning; custom installations of generators, ATS', fuel lines and exhausts.

Power Consulting Tech . . . . . (AE)
Queens, NY
(718) 598-3197 Fax: (718) 217-5662
Contact: Allian Gentille, Electrical Eng. Technician

Preemptive Power . . . . . (AE)
Savannah, GA
(912) 965-0435 Fax: (912) 966-5451
Contact: Dennis Page, CEO
Business: Preemptive Power is developing sensors that can detect load-threatening environmental conditions such as lightning, wind, ice and seismic activity in order to preemptively instruct the ATS to start the generator and isolate the load from potentially dangerous utility line power and service interruptions.

Premier Power Systems, Inc. . . . . . .(DD)
Jacksonville, FL
(904) 389-1115 Fax: (904) 389-1156
Contact: Doug Guy
Business: Sales and service of commercial and residential stand-by power generators and switchgear. Elite Guardian generator dealer and commercial Generac dealer. Service area is Northeast Florida.

Prime Power Services, Inc. . . . . . .(CI)
Austell, GA
(770) 739-2300 Fax: (770) 739-0723
Contact: Richard Knittel, VP Tech. Services
Business: PPSI provides maintenance, consulting, and engineering services for hundreds of thousands of KW's in the Southeast. Our dedication to customer service, our experience and our guaranteed emergency response program has made us the leader in the industry. During our 25 years in the business, we have made our reputation by offering total power system support and service–with maximum certainty.

RTB Electric & Power, Inc. . . . . . .(CI)
Fife, WA
(253) 922-5234 Fax: (253) 922-5320
Contact: Dan Haley, President
Business: Electrical contractors, DC power systems, generator service and repair.

Shirazi, Riaz . . . . . (AR)
Atlanta, GA
(404) 644-5274 Fax: (770) 668-0113
Business: Retired Electrical Engineer from Siemens Energy & Automation in Alpharetta, GA.

Sistemas de Energia, S.A. . . . . . .(DD)
Edo. Aragua, Venezuela
58 (244) 663-3881 Fax: 58 (244) 663-4430
Contact: Hernan R. Rendon, Director
Business: Distributor of generator control modules for Deep Sea Electronics (DSE), electronic governing systems by Governors America Corps (GAC), battery charging systems by Stored Energy Systems (SENS). We service and design control panels and automatic sync-load sharing switchgear to customers' specs.

Site Reliability, LLC. . . . . . .(MR)
The Woodlands, TX
(281) 296-0063 Fax: (281) 296-0069
Contact: Matt Willis, Sr. Partner
Business: We are a manufacturer's representative firm for Eaton ATS and Enercon paralleling switchgear.

Staco Energy Products . . . . . .(MF)
Dayton, OH
(937) 253-1191 Fax: (937) 253-1723
Contact: Chuck Gougler, Marketing Manager
Business: Manufacturer and provider of power quality and voltage control equipment and systems. Single phase UPS, three phase UPS, voltage regulation, power factor connection, active harmonic filters. Tailored power solutions for your electrical network.

TMR Sales & Service Ltd. . . . . . .(CI)
St. Michael, Barbados
(246) 430-5600 Fax: (246) 426-0125
Contact: James Clarke, Managing Director
Business: TMR is an electrical & HVAC contracting firm that focuses on commercial and industrial markets. The electrical division is involved in new and retrofit installations to commercial buildings and industrial plants. TMR supplies & installs electrical distribution switchgear, auto transfer switches, diesel generating sets and ancillary equipment, transformers, motors & starters, UPS systems and fire alarm systems.

Todd Power Services, Inc. . . . . . .(CI)
Orange, CA
(714) 532-9508 Fax: (714) 532-9509
Contact: Daniel C. Todd, President
Business: We are emergency power specialists, we resell, install and service UPS systems, battery systems, generator and ATS systems. We are C10 contractors.

Total Energy Solutions. . . . . . .(DD)
Gonzales, LA
(225) 644-9732 Fax: (225) 644-5007
Contact: Larry Robichaux, Service Manager
Business: Generator sales & service company. Large and small fleet management, mobile fleets as well as standby. Distributor for Taylor Power Systems and MultiQuip generators. In shop and field service 24 hours a day.

WEG Electric Corp. . . . . . .(MF)
Suwanee, GA
(678) 249-2052 Fax: (770) 338-1632
Contact: Catherine Medler, Marketing & Branding Specialist
Business: WEG Electric Corp. is a leading global supplier of motors, drives, controls, generators, and transformers with a focus on quality technology, R&D, customer service and performance.

Weisman Power Systems, LLC . . . . . .(CI)
Annapolis, MD
(410) 266-3522 Fax: (410) 266-3971
Contact: Jason Hock, Vice President
Business: Weisman Power provides sales, service, installation and rentals for all applications. We sell CAT & MTU generators, Active Power UPS and service all equipment. Design and build emergency power systems. We are licensed electricians.

Wells, James . . . . . (AF)
Vancouver, BC Canada
778-688-9500

Winebarger, Jack . . . . . (AF)
Winchester, VA
(540) 877-3574
Business: Student enrolled in Lord Fairfax Community College studying to become an Electrical Contractor. I plan to start my own generating installation business.

Zenith Power Products LLC. . . . . . .(DD)
Bristol, VA
(276) 669-5555 Fax: (877) 933-6748
Contact: David Stringer, VP - Sales & Mktg
Business: Distributor, importer and "manufacturer of record" for a range of spark ignition engines for power generation applications.

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